APRIL 5, 1954

Electrical World

Price 35 Cents

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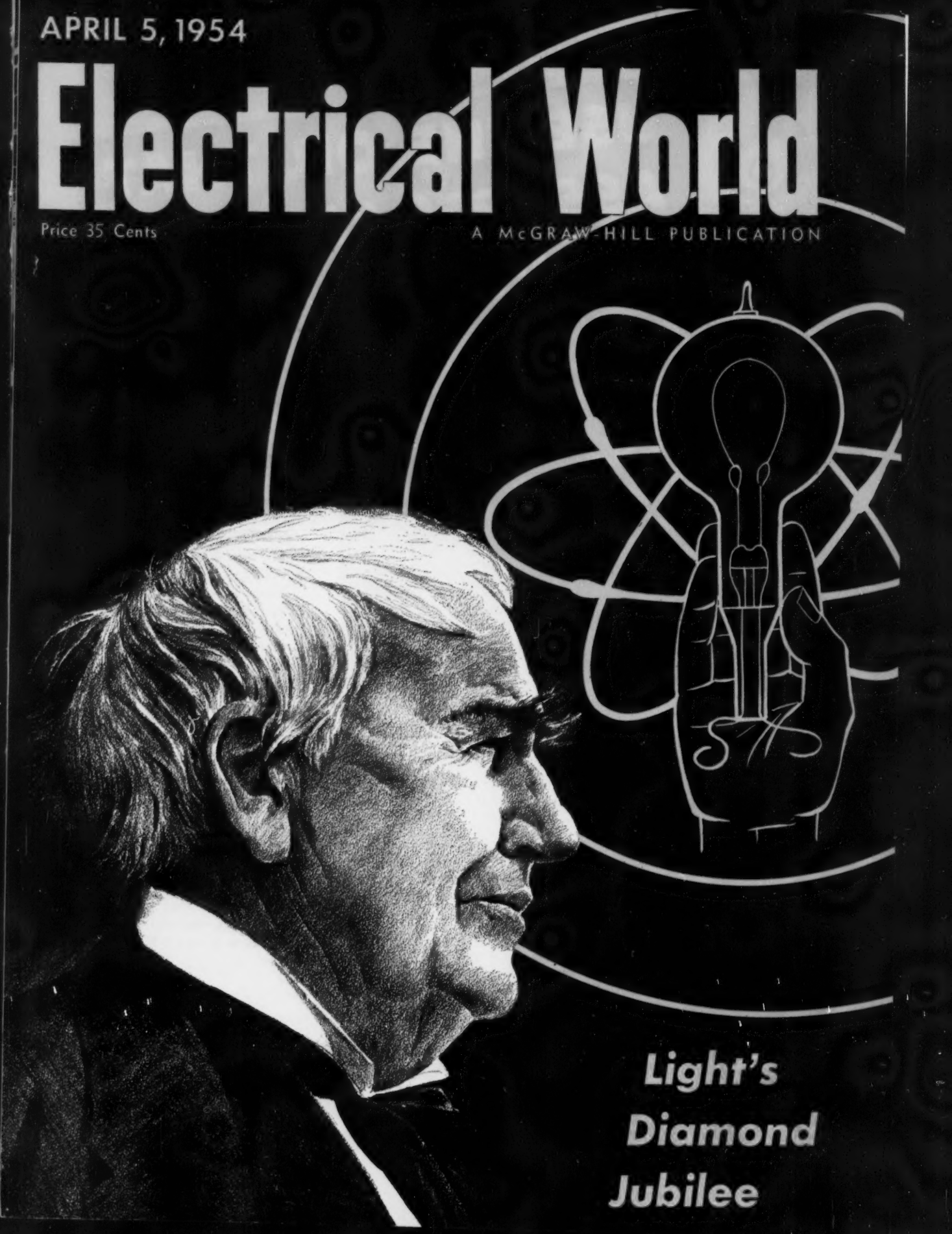
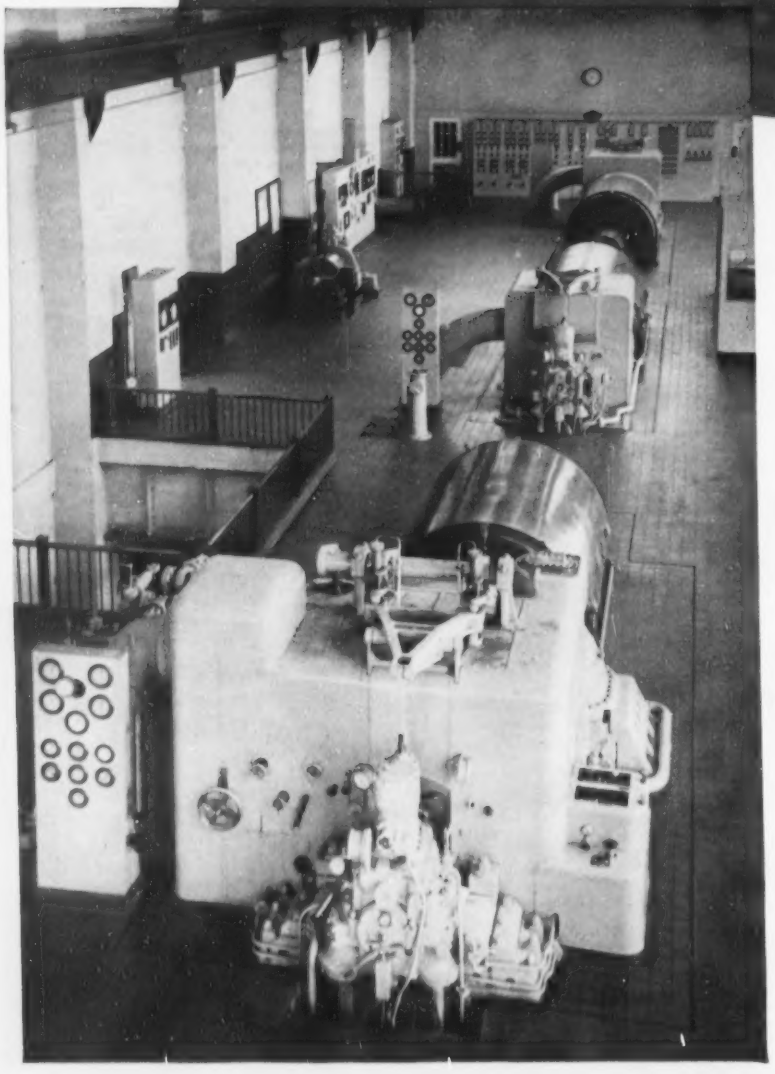


Light's Diamond Jubilee

USE THE OIL THAT ASSURES "ADDED" PROTECTION



TODAY'S DEMANDS for power demand the best in turbine lubrication – *Texaco Regal Oil (R & O)*. This is the oil that has *more than ten times the oxidation resistance of ordinary turbine oils!* It keeps turbine systems free from sludge, rust and foam.

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There is a complete line of *Texaco Regal Oils (R & O)* for every type and size of turbine. They meet the stringent requirements of all leading turbine builders.

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FOR ALL TURBINES

TUNE IN . . . METROPOLITAN OPERA radio broadcasts every Saturday afternoon. See newspaper for time and station.

Salutes Light's Diamond Jubilee

Electrical World is dedicating this issue to Light's Diamond Jubilee.

To celebrate the 75th anniversary of Edison's invention of the incandescent lamp, EW is presenting a 28-page special feature that includes picture interviews of Charles E. Wilson, chairman of LDJ's Sponsoring Committee, and Walter E. Sammis, president of both Ohio Edison Co and Edison Electric Institute, and a round-up of what U. S. power companies are doing to mark the occasion.

CHAS. E. WILSON

Atomic Power's Future . . . The next 20 years will see developments in the use of atomic energy for power generation that will obsolete many of the present methods. This statement was made by Charles Wilson (right), former president of General Electric Co, when interviewed by EW editors for his picture interview on page 98.

Chairman Wilson predicted "You'll have a whole new 'electrical world' to look at in the generation field at Light's Centenary."

In commenting on coal and oil as industry fuels, Wilson said they will be greatly minimized in importance for the generation of electric power.

Meaning of LDJ . . . Significance of the jubilee is explained by Sammis in another picture interview shown on page 104. In his talk Sammis pays homage to Edison and lauds the achievements of the industry.

Celebration activities of individual power companies are highlighted in an 8-page article. In addition, a 3-page report is made on plans and accomplishments of LDJ's national headquarters.

"Sketch Book" . . . The eight-page "Sketch Book" of jubilee ideas appearing on page 117 is intended to spur local imagination in making displays.

Fort Myers Fete . . . Light's Diamond Jubilee was the theme of the 13th Annual Edison Pageant of Light held by Florida's Fort Myers. A four-page feature entitled "Edison's Grandson Revisits Inventor's Florida Retreat" covers the descendants' tour of Edison's estate and participation in the jubilee celebration.

Electrical World

Published for 80 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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ELECTRICAL POWER IN A PIPE IN BRAZIL

88kv

138kv

230kv

The three Oilostatic* systems described here were designed by Okonite engineers in cooperation with the Canadian-Brazilian Services, Ltd., Toronto, Canada. The first one was started in 1949 and rated at 88 kv for 80,000 kva load. 15,200 feet were installed by the Sao Paulo Light and Power Co., Ltd.—a circuit of three 500 MCM cables in a single six inch pipe. Various steps of this installation are shown at the right.

Another Oilostatic* system has been installed by the Rio de Janeiro Tramway Light and Power Co. This installation contains six 1140-foot circuits involving three single conductor 500 MCM cables in each of six pipes, for 138 kv ungrounded service at 75,000 kva load per circuit.

Now on order with Okonite for the Sao Paulo Light and Power Co., Ltd. is an Oilostatic* cable to operate at 230 kv at 75,000 kva. It is the first insulated power cable of this voltage ever ordered in the Western Hemisphere. This system will have four 1600-foot circuits involving three single-conductor 500 MCM cables in each of four separate 8⅝-inch pipes.

*Oilostatic, the original Okonite high oil pressure pipe-type cable system, transmits electrical power through paper insulated conductors which are immersed in oil under pressure in a steel pipe. It is accepted as the safest method of carrying large blocks of power at high voltage underground, providing greatest dielectric strength and current carrying capacity, in addition to automatic supervision.

For information on Oilostatic systems or other applications, we urge you to consult your Okonite representative, or write today to The Okonite Company, Passaic, New Jersey.

1. Installing somastic coated steel pipe which will house 88kv Oilostatic system, at Rua Paula Souza, Sao Paulo.

2. Indenting connector on third 500MCM conductor, with hydraulic press.

3. Building up stress cone at Oilostatic termination.

4. Potheads terminating 88kv Oilostatic line at Bras substation.

HOT-LINE TOOLS
and SAFETY ACCESSORIES
...via GraybaR

Your linemen are only as safe as their equipment—lives depend on its quality.

So, for sure, certain all-over protection order hot-line and safety needs from your near-by Graybar office. Made by well-known, highly-regarded manufacturers, they're all products your linemen respect... work with in confidence.

Chance hot-line tools — Graybar can supply Chance hot-line maintenance tools individually or in sets. Incorporating the latest developments in equipment for handling energized lines, Chance tools are tested to withstand 75,000 volts per foot. Metal fittings are lightweight, heat-treated aluminum alloy...poles are laminated Sitka Spruce. There's a specialized Chance tool designed to do every hot-line job safely and efficiently.

Salisbury Rubber safety accessories — Graybar distributes Salisbury protective devices of all types — rubber line hose and insulator hoods . . . rubber blankets and jackets . . . rubber coats, gloves, and sleeves. All are top-quality fully-guaranteed products made of purest crude rubber.

Call Graybar for all of your other pole-line needs as well. You can rely on your local Graybar Representative to provide complete, accurate information on anything you require. For special help on out-of-the ordinary problems, feel free to ask for the assistance of a Graybar Outside Construction Specialist. *Graybar Electric Co., Inc. Executive Offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.*

347-94

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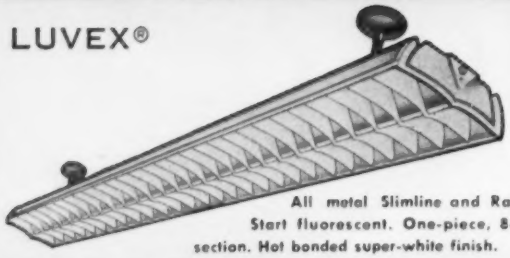
Highest quality commercial fixture available to fit the modest lighting budget. Low in cost, high in appearance and performance.

LUVEX®



All metal Slimline and Rapid-Start fluorescent. One-piece, 8-foot section. Hot bonded super-white finish.

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PLEXOLINE®

A complete lighting system. Linear sections and circular accent units permit unlimited lighting patterns including curves, angles, abstract designs. Slimline and Rapid-Start fluorescent.

MOBILEX®

Flexible recessed lighting system designed for use with new, low-cost grid-type and spline suspended ceilings. Moulded plastic, glass and louvered shielding.

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Four interchangeable shielding elements fit basic channel. Both flange and snap-in types. In Slimline and Rapid-Start fluorescent.

...BEFORE YOU BUY

This is just a glimpse of the nation's leading line of lighting fixtures. Whatever the lighting job, there's a quality Day-Brite fixture to do it—not just as well, but better!

Best way to have the full picture of the Day-Brite line is to have an up-to-date catalog. If you don't already have one, write to the address below.

DAY-BRITE LIGHTING, INC., 5417 Bulwer Ave., St. Louis 7, Mo. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

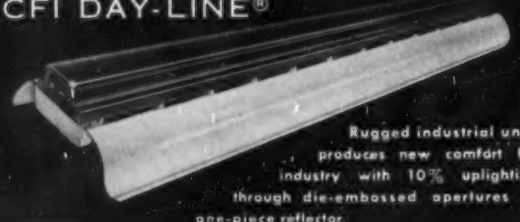
DECIDEDLY BETTER DAY-BRITE Lighting Fixtures

448

PARA-LOUVER® TROFFERS

Alzak aluminum parabolic unit with sensational new PARA-LOUVERS —reduces lengthwise brightness up to 50%.

CFI DAY-LINE®



Rugged industrial unit, produces new comfort for industry with 10% uplighting through die-embossed apertures in one-piece reflector.

NATIONALLY DISTRIBUTED, EXCLUSIVELY THROUGH LEADING ELECTRICAL WHOLESALERS

(ADVERTISEMENT)

Keeping Thermal Expansion Under Control

Flexible support for piping in all positions of travel must be provided, if destructive stresses and strains are to be avoided in today's high temperature piping systems.

Heat 100 linear feet of alloy steel pipe to 1000° F, and it will expand 9.1 inches! When this thermal expansion takes place in a piping system, the resultant forces induced, if uncontrolled, can do incalculable harm.

Helical coil springs

The practice of using helical coil springs to allow this thermal expansion to occur is quite general. But the care that goes into the design or selection of flexible supports ofttimes is haphazard. In fact, many specifications covering the support of important high temperature piping will simply say "spring hangers shall be provided". Merely to contend that this may be dangerous is not enough.

Safety of entire system at stake

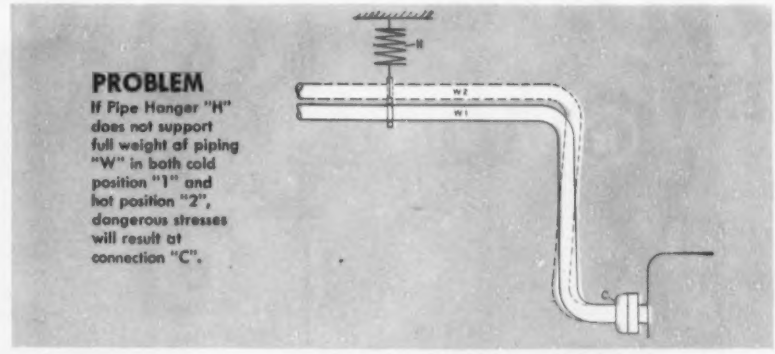
Unless careful study is given to the design and selection of spring supports which will maintain a balanced pipe system, the transfer of weight from one hanger to another, or from a hanger to a terminal point, will endanger the safety factor of the entire system.

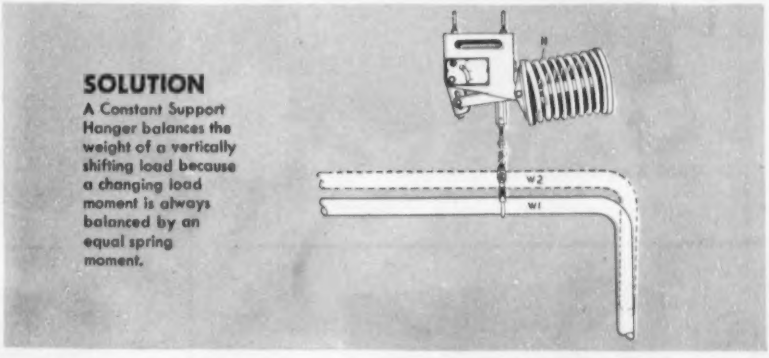
With 8 . . . 9 . . . even 10 inches of thermal deflection not a bit uncommon today, completely flexible support for piping in all positions of travel is a positive "must".

The case for constant-support hangers

Where reactive forces at terminal points in a piping system must be kept within specified limits, constant support type hangers are recommended.

They are designed to provide uniform supporting force equal to the pipe load throughout the travel range and should be used at superheater outlets, turbine connections, and also on high temperature and other critical lines.

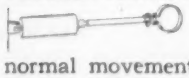

PROBLEM
If Pipe Hanger "H" does not support full weight of piping "W" in both cold position "1" and hot position "2", dangerous stresses will result at connection "C".
H
W2
W1
C


SOLUTION
A Constant Support Hanger balances the weight of a vertically shifting load because a changing load moment is always balanced by an equal spring moment.
H
W2
W1

Variable spring hangers

When pipe lines are subject to vertical movement, and restrictive conditions do not require a constant-support type hanger, variable spring hangers are recommended. They should be designed to support not less than 85%, or more than 120%, of the design load throughout the total travel.

Vibration control and sway brace



When necessary to prevent abnormal movement or vibration in pipe lines, controls or sway braces of the energy-absorbing or instant-acting counter force type, are recommended. They dampen vibration, oppose pipe sway and absorb shock.

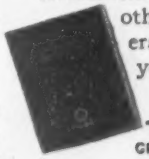
Hanger Engineering Service

The Pipe Suspension Department of Grinnell Company offers a design service to engineering firms which appreciate the specialized knowledge required to compute hanger loads and to select the proper supports for a balanced pipe suspension system when high pressures and high temperatures are involved.

Grinnell manufactures a complete line of pipe hangers and supports; maintains an experienced laboratory staff of technicians to discover better ways of solving pipe suspension problems; provides engineering assistance in design and installation; offers stocks of pipe hangers close to any job.

Hanger load calculation booklet

A 28-page booklet entitled "Hanger Load Calculations", compiled to furnish necessary data and procedure to determine pipe hanger loads, can be obtained from Grinnell Company. The tabulations of piping weights and thermal expansion have been arranged for convenient selection of data that otherwise consume considerable time to develop. It's yours without obligation.



GRINNELL COMPANY, INC.

252 West Exchange St., Providence, Rhode Island

Kindly send me a complimentary copy of your "Hanger Load Calculations" booklet.

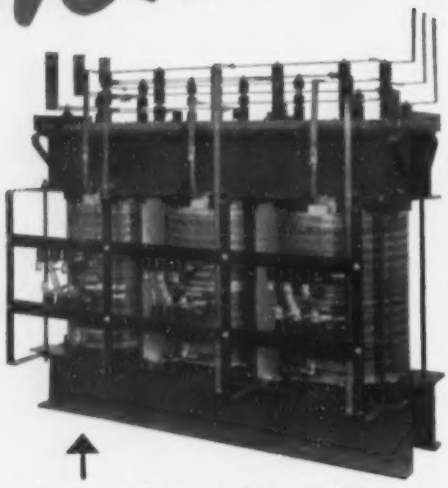
Name.....

Company.....

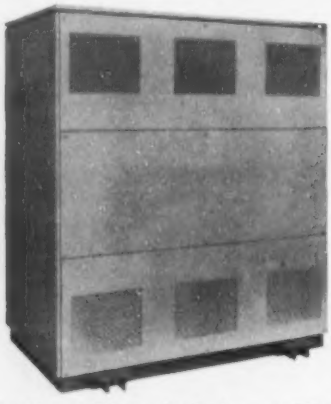
Address.....

City..... State.....

Now...84 Pennsylvania

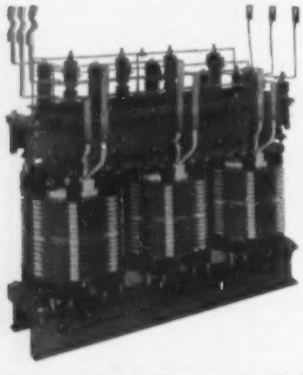


2000 Kva, 3 Phase, 60 Cycles, 150°C. Rise.
2400Δ-480Δ volts.
Station auxiliary, sealed-in-nitrogen.



1000 Kva, 3 Phase, 60 Cycles, 150°C. Rise.
12,470Y-480Δ volts.
Unit substation service, ventilated type.

1000 Kva, 3 Phase, 60 Cycles, 150°C. Rise.
12,000Δ-480Y/277 volts.
Unit substation service, sealed-in-nitrogen.



500 Kva, 3 Phase, 60 Cycles, 150°C. Rise.
2400Δ/4160Y-480Δ volts.
Network, submersible, sealed-in-nitrogen.

500 Kva, 3 Phase, 60 Cycles, 150°C. Rise.
12,500Δ-216Y/125 volts.
Network, submersible, sealed-in-nitrogen.

CLASS H Transformers

in Service... Including 4-2000 kva Units

The Largest Class H Transformers Ever Built

No doubt about it — Class H transformers are the greatest transformer development of the last decade. Nothing like it has captured the imagination of the transformer industry since the introduction of cold rolled steel.

Pennsylvania Transformer engineers have pioneered the development of Class H insulating materials and are credited with designing and placing into service the world's largest Class H units.

Eighty-four Pennsylvania Class H transformers, ranging in size from 250 Kva through 2000 Kva — up to and including 15 Kv — are installed in unit substations, network systems, and generating stations throughout the country. The trouble-free operating record of every one of these units is substantial proof of the outstanding electrical and mechanical designs of Pennsylvania Class H Transformers.

Among the many advantages of Class H Transformers are the following:

- Safest transformers ever developed;
- No fire or explosion hazard;
- Carry the lowest fire insurance rates;
- Least affected by water;
- Exceptionally high overload capacities;
- Minimum maintenance — even in highly contaminated areas.

PENNSYLVANIA CLASS H TRANSFORMERS are available in the following sizes:

	KVA	VOLTAGE
Ventilated	Up to 3000	Up to 15 Kv
Sealed-in-Nitrogen	Up to 2000	Up to 15 Kv

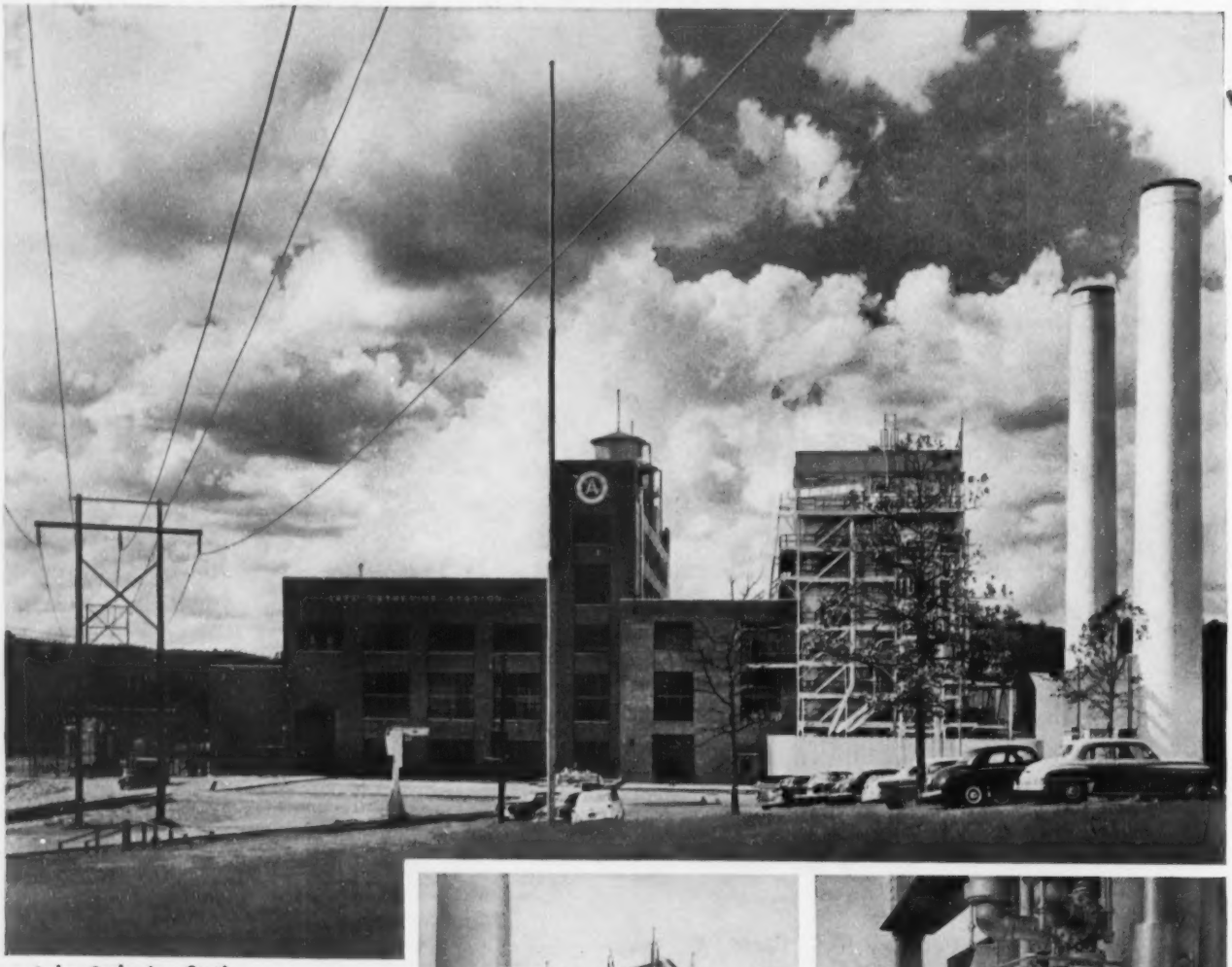
For further information on Pennsylvania Class H transformers, we invite you to write to Pennsylvania Transformer Company, Box 330, Canonsburg, Pa., and ask for your free copy of Bulletin 951 — "H . . . in a Class by Itself."

PENNSYLVANIA TRANSFORMER COMPANY

A McGRAW ELECTRIC COMPANY DIVISION

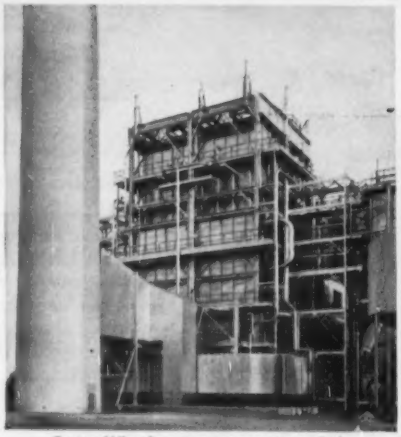
CANONSBURG, PENNSYLVANIA • ***Greater Pittsburgh District***

FOUR MORE OUTDOOR

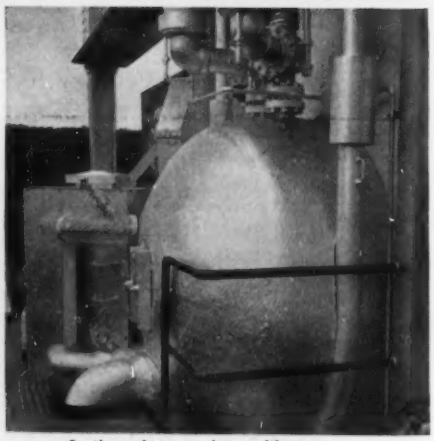


Lake Catherine Station of the Arkansas Power and Light Company.

All Units
Engineered By:
EBASCO SERVICES INC.



Foster Wheeler steam generator of the outdoor-type installed at the Arkansas Power and Light Company. Typical of those installed at Louisiana Power and Light Company, and Mississippi Power and Light Company.



Section of steam drum with external weatherproof covering protruding through water-tight, air-tight steam generator casing.

STEAM GENERATORS!

Foster Wheeler outdoor-type steam generators, each of 900,000 lb per hr capacity, now serving

Lake Catherine Station.....1 unit
ARKANSAS POWER AND LIGHT COMPANY

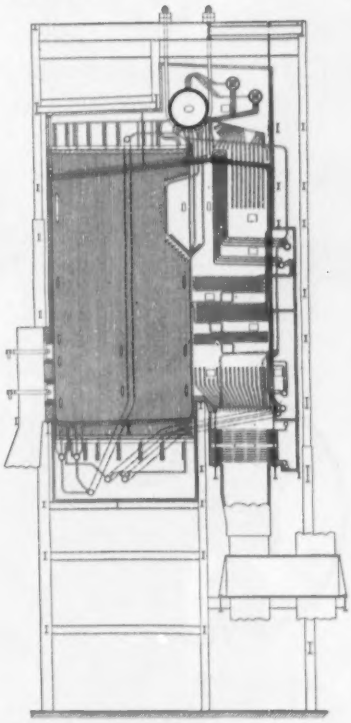
Ninemile Point Steam Electric Generating Station.....1 unit
LOUISIANA POWER & LIGHT COMPANY

Delta Steam Electric Station.....2 units
MISSISSIPPI POWER AND LIGHT COMPANY

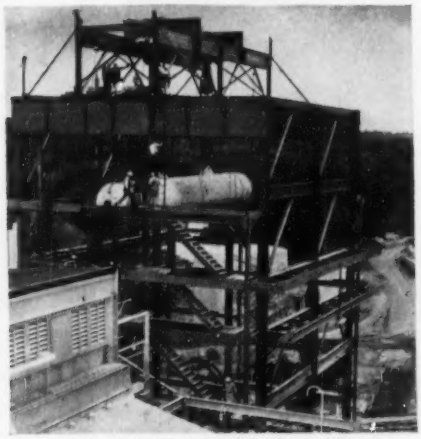
Reflecting the wide acceptance of the outdoor-type steam generator, these four Foster Wheeler units are all serving power plants in the South. Because of the traditionally mild climate in these areas, the minimum of weather protection is required for personnel, steam generating units and auxiliaries. This same basic design has proved practical and economical in the Northern States, the only difference being in the extent of weather protection provided.

Each of these new steam generators has a capacity of 900,000 lb per hr continuously, and 950,000 lb per hr for an eight hour peak. Each delivers steam at 1550 psi and 1005F at the superheater outlet. A superheat control condenser maintains steam temperature constant over an operating range from 600,000 lb to 950,000 lb per hr.

Because of the proven economy and suitability of outdoor-type construction under a wide variety of climates, Foster Wheeler units, such as these, bring a new abundance of low-cost power to help promote the industrial growth of the regions they serve.



Cross-sectional elevation of the Foster Wheeler 900,000 lb per hr outdoor-type steam generator. Arrangement provides for modification of furnace for future pulverized coal firing.



The 145 ton drum of the Foster Wheeler outdoor-type steam generator being placed in position on structural steel framework at Lake Catherine Station.

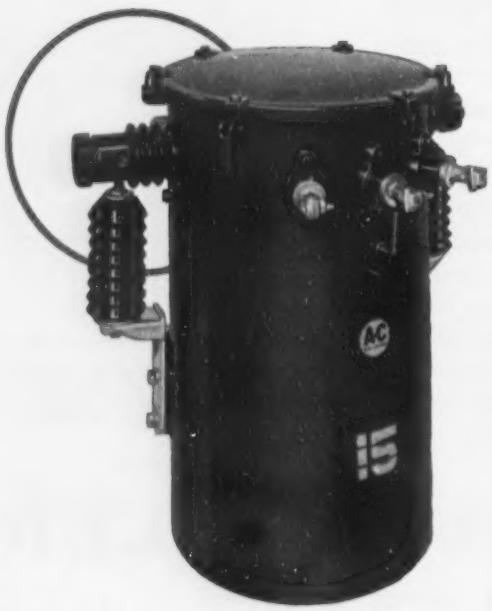
FOSTER WHEELER

FOSTER WHEELER CORPORATION
165 Broadway, New York 6, N. Y.

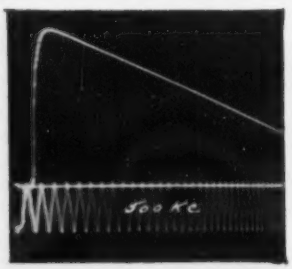
Twist of Wrist
COMPLETES CONNECTION

TURN THE CLAMPING KNOB on Allis-Chalmers new high voltage sidewall bushing to complete installation connections. It grips two standard conductors as large as No. 2 stranded cable at the same time. It eliminates splicing. Make connections from either side of bushing quickly, without tools. Its design gives complete protection against live parts.

The new sidewall bushing is supplied on Allis-Chalmers distribution transformers 167 kva and smaller, 5 kv and below. Get complete facts from your nearby Allis-Chalmers authorized dealer or district office, or write Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin.



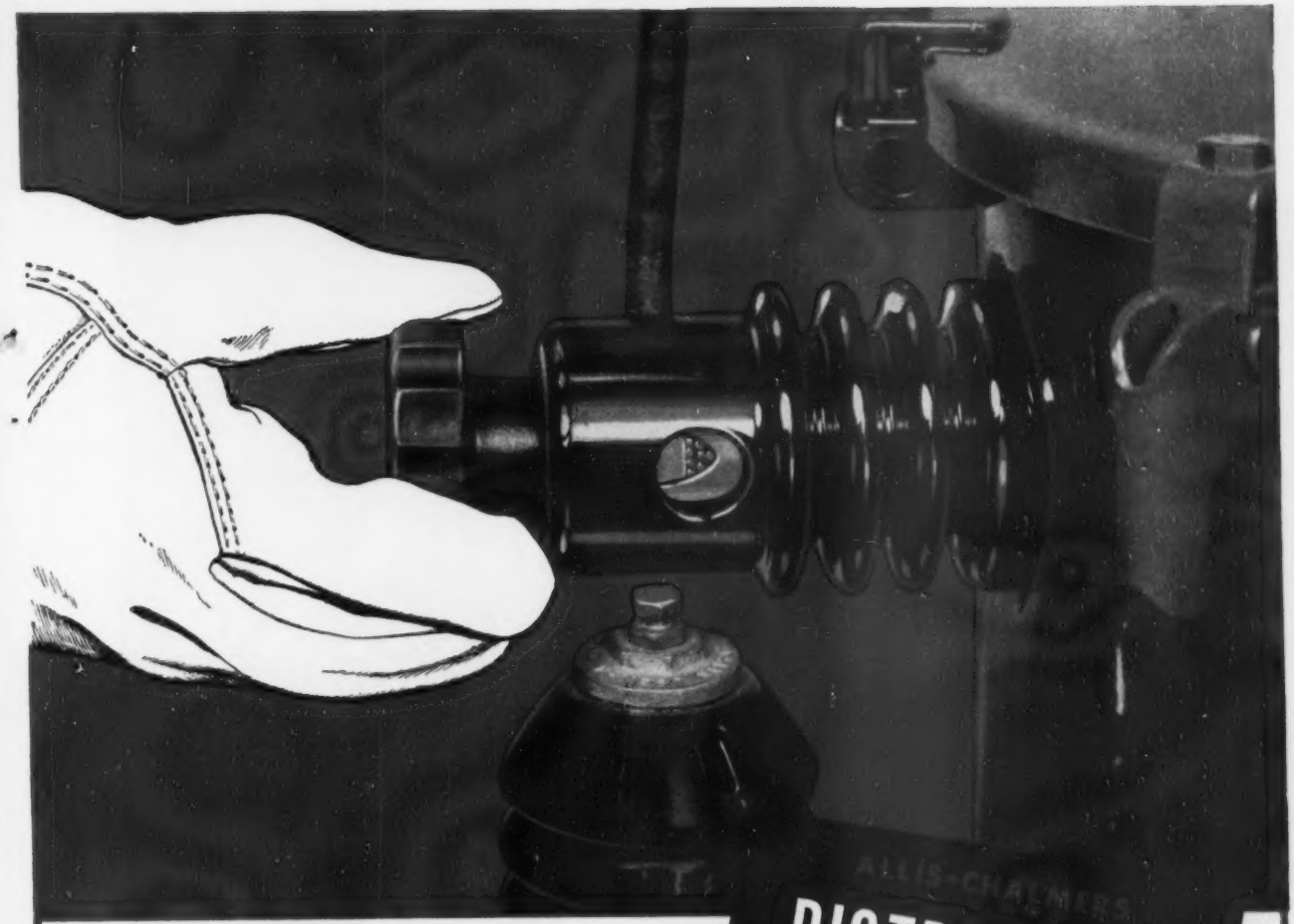
Proof of Performance for EVERY Standard Distribution Transformer



You know you get all the inherent insulation strength possible in an Allis-Chalmers distribution transformer. The oscillogram (right)—taken from a production line impulse test — proves it. It shows that all the production processes necessary to extend transformer life have been carried out. Not only distribution transformers with protective equipment, but conventional units are tested as well. This is Allis-Chalmers eighth year of production line impulse testing.

A-4345

ALLIS-



DISTRIBUTION TRANSFORMERS

FEATURES

1 Large molded phenolic clamping knob with finger-grips facilitates turning. It will not fall off, even when completely backed-off. Knob collar keeps fingers away from live parts.

2 Convex surfaced ram, actuated by knob, forces wires against the concave surface of connector body. This snubbing action locks the cable in the connector. All parts are tinned.

3 Integral bushing electrode simplifies lightning arrester installation on transformers. Gap from bushing to lightning arrester terminal removes electrical stress from the arrester except when flashover occurs.

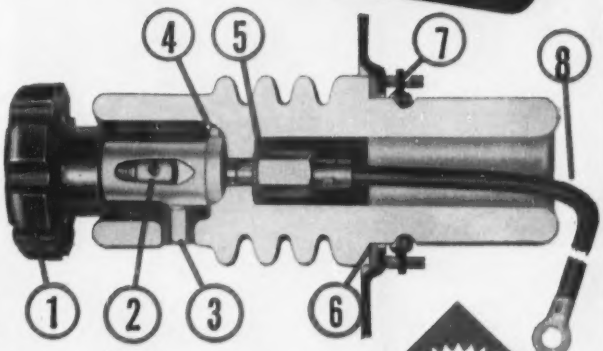
4 Connector is keyed to porcelain preventing rotation, thus protecting the gasket against twist or shear. Gasket prevents oil leakage.

5 Fibre gasket provides mechanical cushion between metal parts and porcelain.

6 Bushing is sealed in tank wall with corprene gasket. Recessed seat retains gasket for effective seal.

7 Internal clamping ring keeps bushing locked securely in place. Bolts exert even pressure on tank wall to produce uniform gasket compression. Internal ring helps simplify external maintenance.

8 Bushing cable terminates at terminal board. Easy removal simplifies routine maintenance.



CHALMERS

A-C ALLIS-CHALMERS

Has your 2-Way Radio system reached retirement age?

FORGET about how long you've operated one mobile communication system. Years aren't important. The *actual* age is measured by looking at yesterday's use. Look for abnormal road shock . . . severe weather exposure . . . day-in and day-out service because you *had* to work extra hours. Any or all of these conditions may have earmarked your 2-way radio equipment for an early grave. Find out too, if the system you are now using is adequate by today's standards. Will it meet the greatly expanded service needs of your industry?

Electric utilities show an amazing growth during the past seven years. Compared with 1947, kwhr demand has increased 75% bringing service to 11.5 million new customers. And, radio installations have *not* kept pace with this expansion.

Find out the true value of your mobile communications today. If the system is sub-standard for any reason then be sure to compare these features on all new equipment: Initial expense . . . dependable performance *at all times* . . . long-life and *particularly* maintenance cost. The final score on this type of comparison will always show why General Electric 2-way radio is preferred.

2-WAY MOBILE RADIO

A G-E COMMUNICATIONS COUNSELOR will provide valuable assistance in this program as well as on all communication problems. Call him at a local office or write us today: *General Electric Company, Section X1944-5, Electronics Park, Syracuse, New York.*

Follow the trend . . . replace with G-E!

GENERAL ELECTRIC

How Correct Lubrication cured them— and saved 37 production hours per week!

SOCONY-VACUUM

Correct Lubrication

FIRST STEP IN CUTTING COSTS

You could almost set your watch by it. At first, everything was normal. Then—slowly, mysteriously—it happened...the "jaws" gradually stiffened, moved more and more erratically, finally froze rigid. "Lockjaw" had set in again!

It was happening in a large auto plant. Twice a day five big lathes were shut down for 45 minutes while the chucks—or "jaws"—were cleaned and repacked with fresh grease so that production could continue on crank shaft forgings. All remedies had failed.

A Socony-Vacuum man discovered this situation while making an analysis of the plant. Shocked by this huge waste of time and production, he asked one of his staff engineers to investigate.

This engineer studied the problem, made lab tests, found that cutting coolant, continuously splashing over the chucks, caused the grease to harden. He recommended a special Gargoyle grease—Sovarex #1. It cured the "lockjaw."

This is an actual case. It points up how much you may gain by using *Correct Lubrication*—top-quality products *plus* the world's greatest lubrication knowledge and engineering service. Can you afford to accept anything less?

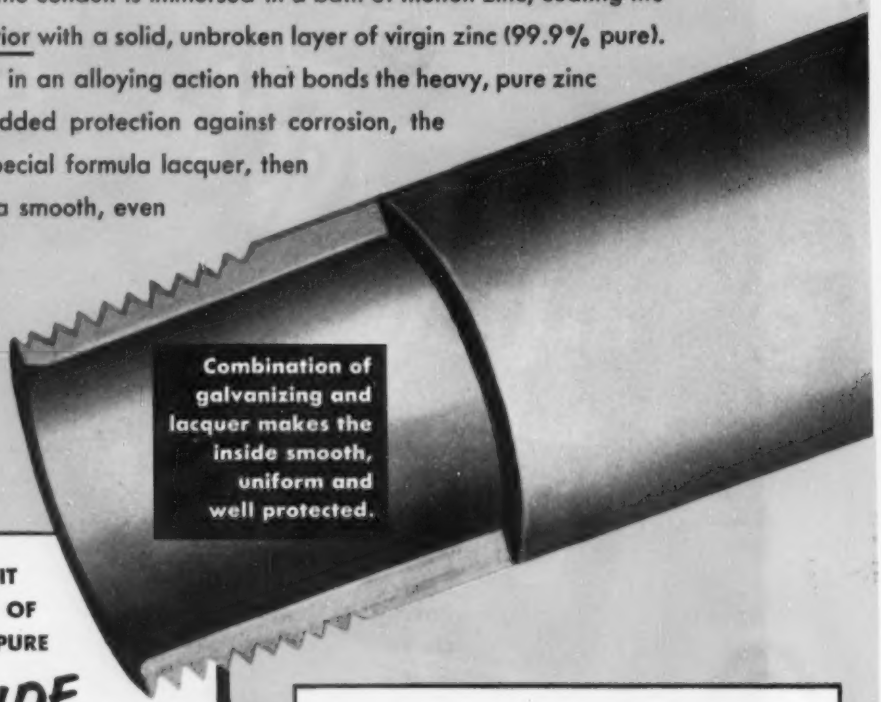
SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

Here are the facts about Triangle's Hot-

Triangle Hot-Dip Galvanized Rigid Steel Conduit is produced from choice sections of the highest grade ingots. This insures a perfect base for proper bonding of the zinc. Every length is thoroughly scoured and pickled in acid, leaving the pipe perfectly clean before the application of the protective zinc coating.

When perfectly clean, the conduit is immersed in a bath of molten zinc, coating the *interior* as well as the exterior with a solid, unbroken layer of virgin zinc (99.9% pure). The hot-dip process results in an alloying action that bonds the heavy, pure zinc coating to the pipe. As added protection against corrosion, the conduit is submerged in special formula lacquer, then baked, giving the conduit a smooth, even finish.

Conforms to Federal Spec.
WWC-581b (Galvanized)



Combination of galvanizing and lacquer makes the inside smooth, uniform and well protected.

EVERY LENGTH OF CONDUIT IS IMMERSED IN A BATH OF MOLTEN ZINC — 99.9% PURE

INSIDE AND OUTSIDE

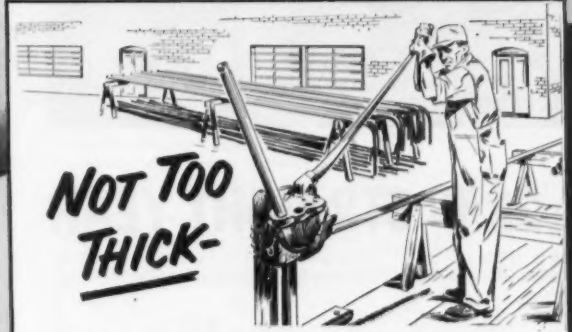
Every square inch of the conduit — inside and outside — is thoroughly and uniformly coated with pure zinc. Remember, because of condensation, the inside of conduit is just as subject to corrosion as the outside. That's why it's important to specify Triangle Conduit — protected inside and outside.

HOT-DIP GALVANIZING IS UNIFORM NOT TOO THIN-

Coatings that are too thin in even one spot, are likely to develop tiny pin-point holes through which corrosion can creep. There is no possibility of thin spots in zinc applied by the Triangle hot-dip galvanizing method. The thickness of the zinc coating is uniform — *exactly* the same from one end to the other. Hot-dip galvanized coating is two or three times as thick as other coatings.

Dip Galvanized Conduit.

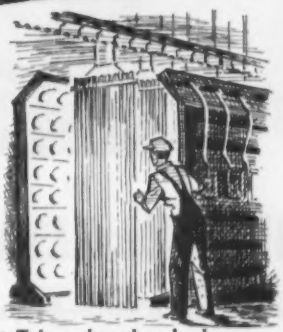
NOT TOO THICK-



If the coating on conduit is too thick, it is subject to cracking and flaking when being bent. Careful controls keep the coating of Triangle Conduit at just the *right* thickness — always.

Never too thick — never too thin.

AND AN EXTRA BONUS!



A clear lacquer is applied and baked on the conduit. Not only does Triangle apply the best protective coating (molten zinc) but Triangle also bakes on an additional transparent lacquer of special formula. The application of this baked-on coating insures a permanently smooth interior (for easy pulling) and also provides additional protection against rust or corrosion. It also protects the conduit during shipment.

TRIANGLE CONDUIT is Hot-Dip Galvanized—

and Triangle's hot-dip galvanizing has never been surpassed

TRIANGLE CONDUIT & CABLE CO., INC. New Brunswick, N. J.

Manufacturers of Arteries for Electricity, Liquids and Gases

WIRE • CABLE • CONDUIT • PLASTIC PIPE • BRASS AND COPPER TUBE

Plants—New Brunswick, N. J.: Wire and Cable Plant, Rod Mill, Brass and Copper Tube Mill, Plastic Pipe Plant. Moundsville, W. Va.: Conduit Plant.

"It MUST Be Right!"

International leads again...

New INTERNATIONAL R-195 ROADLINER® with famous Super Red Diamond engine. Gasoline, LPG, or diesel power. GCW rating, 48,000 lbs. Wheelbases 133, 142 and 157 inches.

FIRST IN HEAVY-DUTY SALES 22ND STRAIGHT YEAR

For the 22nd straight year, men who know hauling costs have bought more heavy-duty INTERNATIONAL Trucks than any other make.

The reason is INTERNATIONAL *quality.* And cost records prove it. Operators' records show that INTERNATIONALS stay on the job longer . . . deliver more tons of payload for each dollar invested.

It will pay you to see your INTERNATIONAL Dealer or Branch. Let him show you how these built-for-the-job trucks can do a cost-lowering job for *you.* Time payments arranged.

INTERNATIONAL BUILDS AMERICA'S MOST COMPLETE TRUCK LINE

170 basic models from ½-ton pickups to 90,000 lbs. GVW off-highway models . . . including six-wheel, four-wheel drive, cab-forward and multi-stop delivery types . . . 29 engines from 100 to 356 hp., with widest choice of gasoline, LPG, or diesel power . . . wheelbases, transmissions and axle ratios for any need . . . thousands of variations for exact job specialization.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

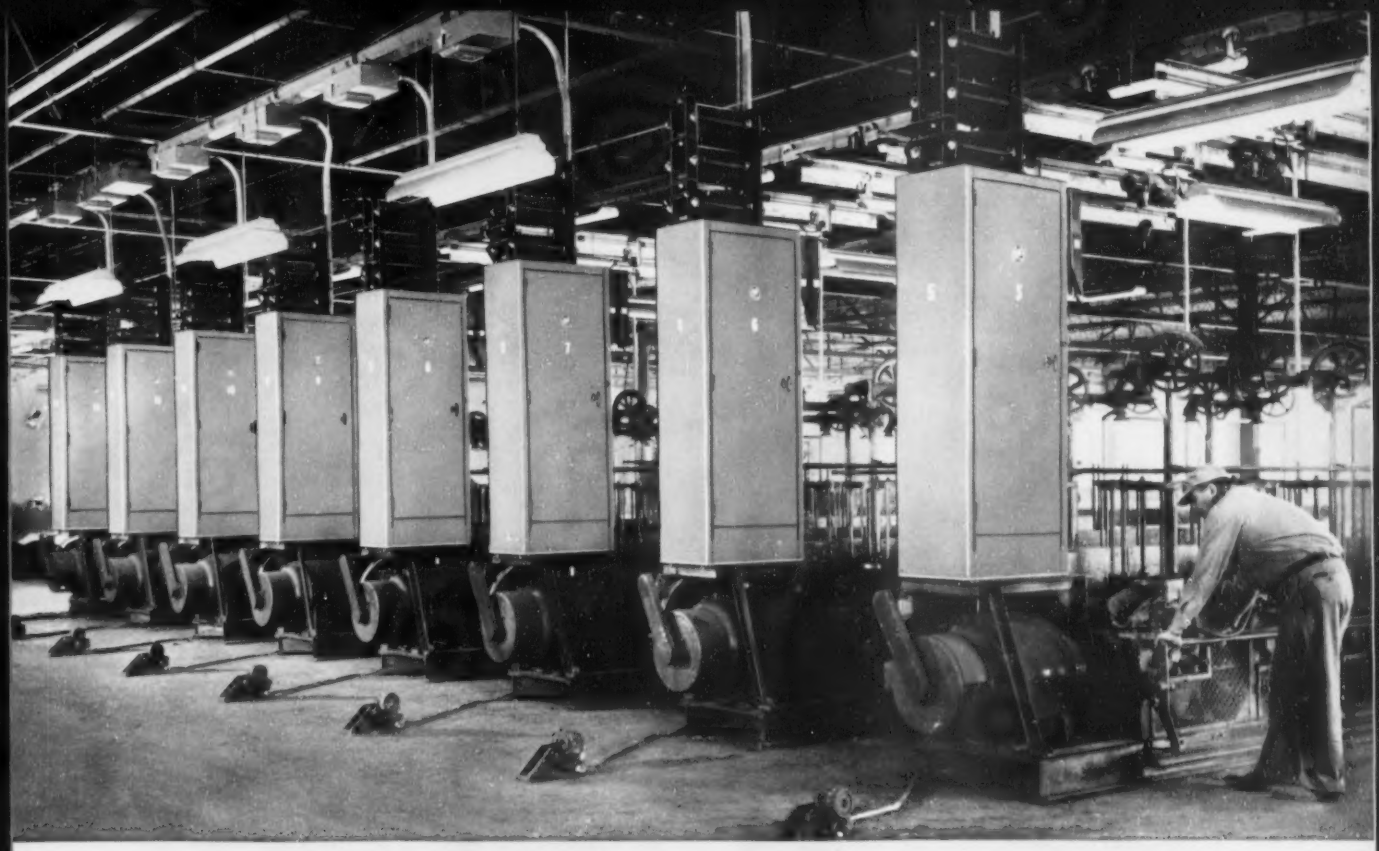
Before you buy any truck remember **Cost-conscious Truck Operators Prefer INTERNATIONALS!**

International Harvester Builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL® TRUCKS

"Standard of the Highway"



Eight Allen-Bradley Bulletin 761 100 hp automatic slip ring motor starters on wire drawing machines in Kansas City plant of Union Wire Rope Company. A total of 14 —100 hp 4-point starters, 2 —50 hp 4-point starters, and 2 —50 hp 3-point starters are included in this installation.

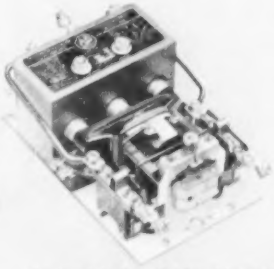
100 HP Solenoid Operated

SLIP RING MOTOR STARTERS

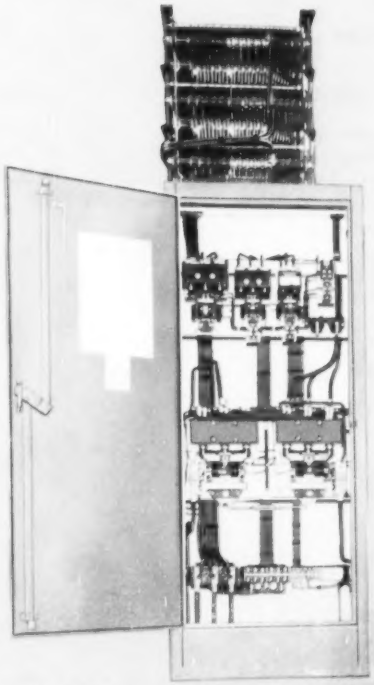
provide trouble free control for wire drawing machines

The accelerating contactors and the magnetic switches in these Allen-Bradley Bulletin 761 Slip Ring Motor Starters are simple, solenoid operated units. There is only one moving part . . . the one-piece solenoid plunger with double break, silver alloy contacts. Such simplicity assures long, trouble free life. The silver alloy contacts require no maintenance.

In this installation the grid type accelerating resistors are mounted above the starter cabinets. Timing relays on starter panel govern rate of acceleration. The operator merely pushes the START button . . . and the Bulletin 761 starter goes through the complete starting cycle automatically. When you have a tough control problem, consult Allen-Bradley.



Basic unit is the A-B solenoid starter with overload relays.



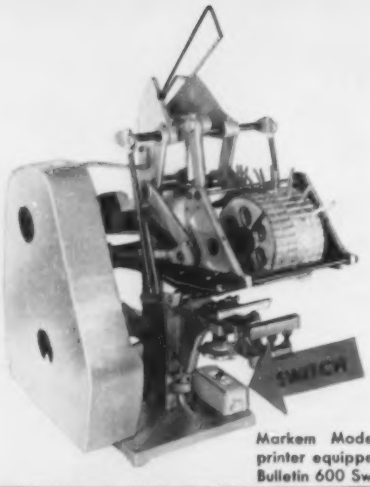
Bulletin 761 automatic slip ring motor starter (100 hp) with cabinet open to show panel of solenoid contactors, starters, and timing relays.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

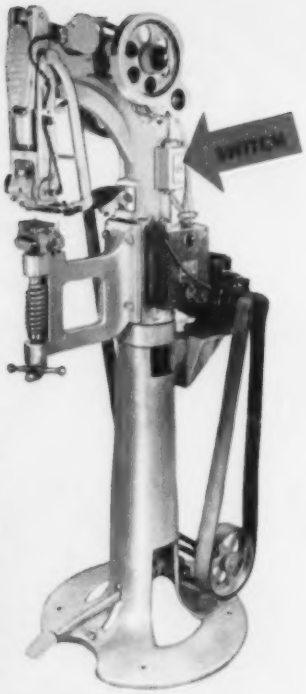
ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

2-54-M

Markem Model 105 heavy duty box and label printer equipped with an A-B Bulletin 600 Manual Starting Switch.



Markem Model 45AC printer equipped with a Bulletin 600 Switch.



Markem No. 2 embosser for indenting and coloring on plastics, wood, leather, etc., with A-B Bulletin 600 Switch.

SNAP SWITCH *with* OVERLOAD BREAKER FOR 1 HP MOTORS AND SMALLER

● Burnouts of small motors can often cause serious production delays. Therefore, dependable overload protection is absolutely essential . . . and for motors of 1 hp or less the Allen-Bradley Bulletin 600 Starting Switch is the logical answer.

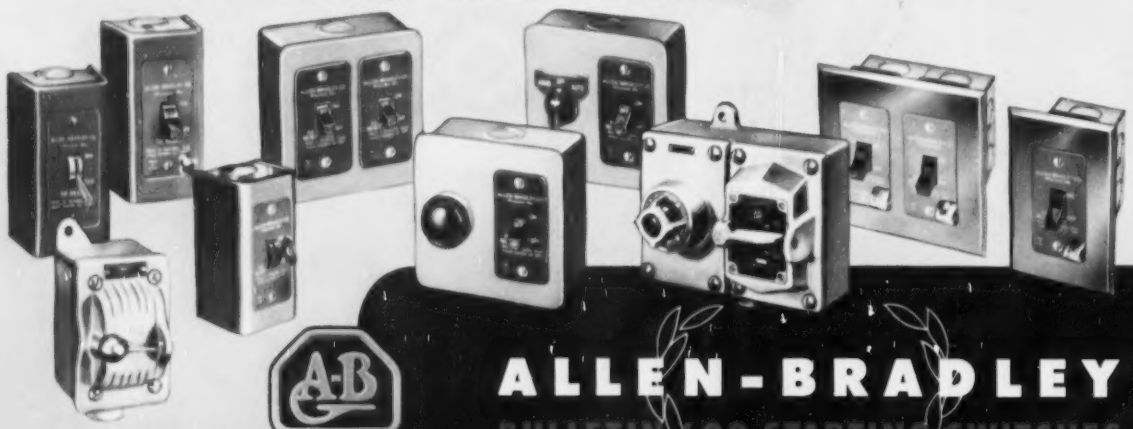
It has a built-in thermal overload breaker which trips the toggle switch in case the motor is overloaded . . . and you can't keep the switch closed until the overload on the motor is cleared.

The Bulletin 600 Manual Starting Switch is ideal for small a-c and d-c motors on space heaters, stokers, refrigeration compressors, fans, pumps, packaging machines, labelers, grinders, and other light machinery.

Available in open type construction and also in standard sheet metal enclosures, waterproof and weatherproof enclosures, and gastight enclosures for installations in hazardous gas locations.

Bulletin 600 Manual Starting Switches can be furnished in various auxiliary combinations—namely, with pilot lights, selector switches, and key and lever switches, as illustrated below. They will fit into standard conduit switch boxes if desired. The double break, silver alloy contacts need no attention. Bulletin 600 gives dimensions and other data.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.



A few examples of the variety of enclosure combinations in the Bulletin 600 Manual Starting Switch line.

A-B Quality

ALLEN-BRADLEY

BULLETIN 600 STARTING SWITCHES

QUALITY

2-54-MR

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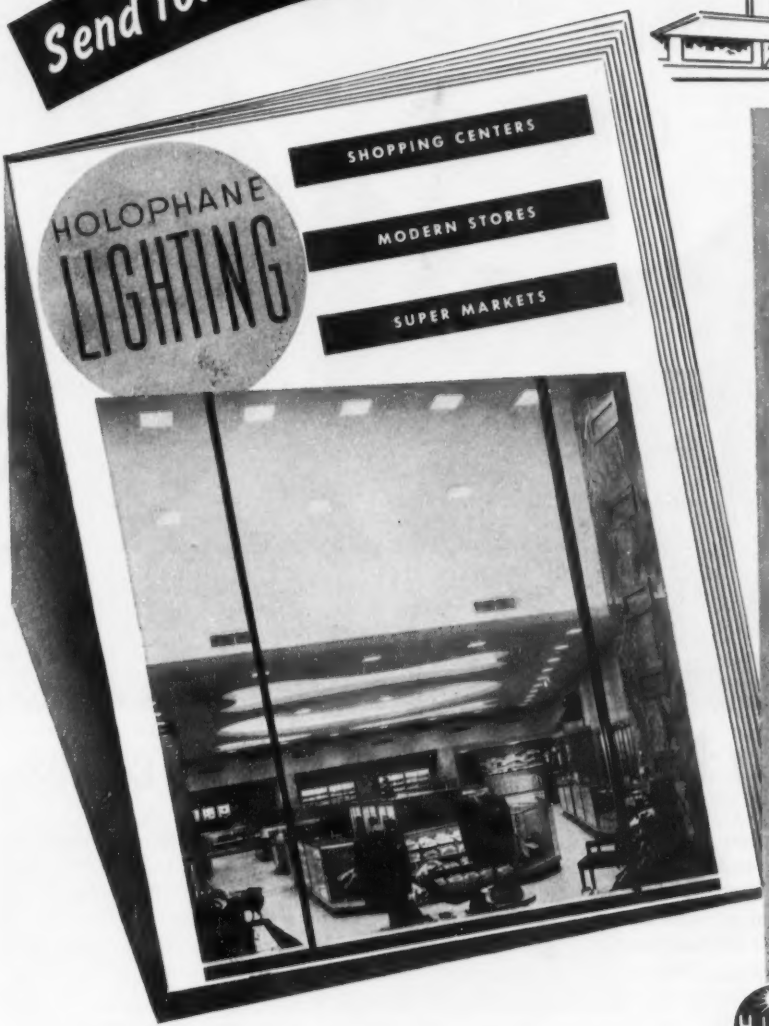
Most Complete Authoritative Guide to Modern STORE LIGHTING Ever Published!



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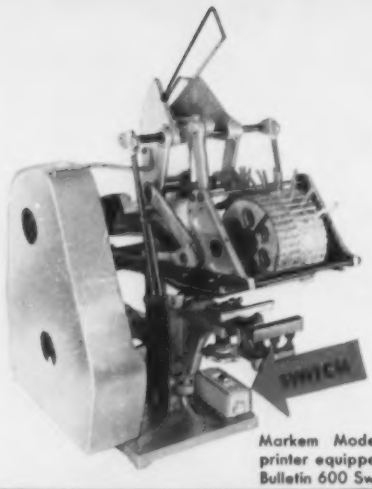
Markem Model 105 heavy duty box and label printer equipped with an A-B Bulletin 600 Manual Starting Switch.



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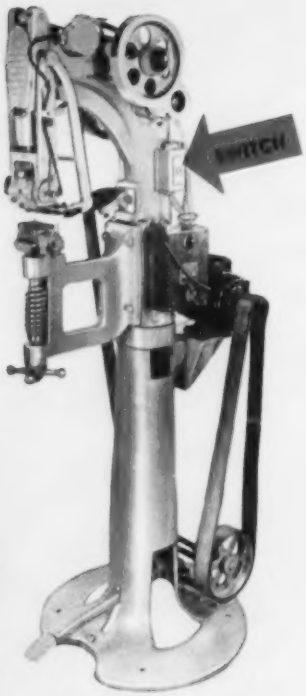

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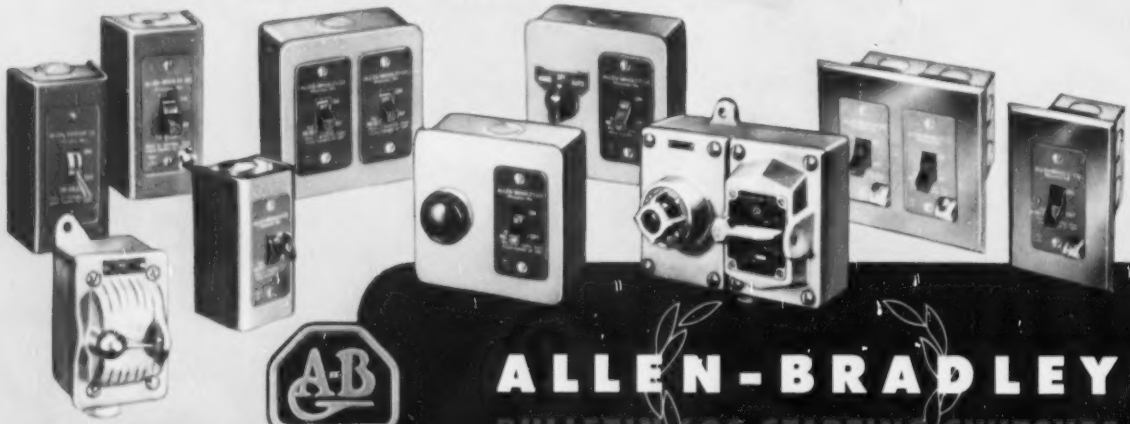

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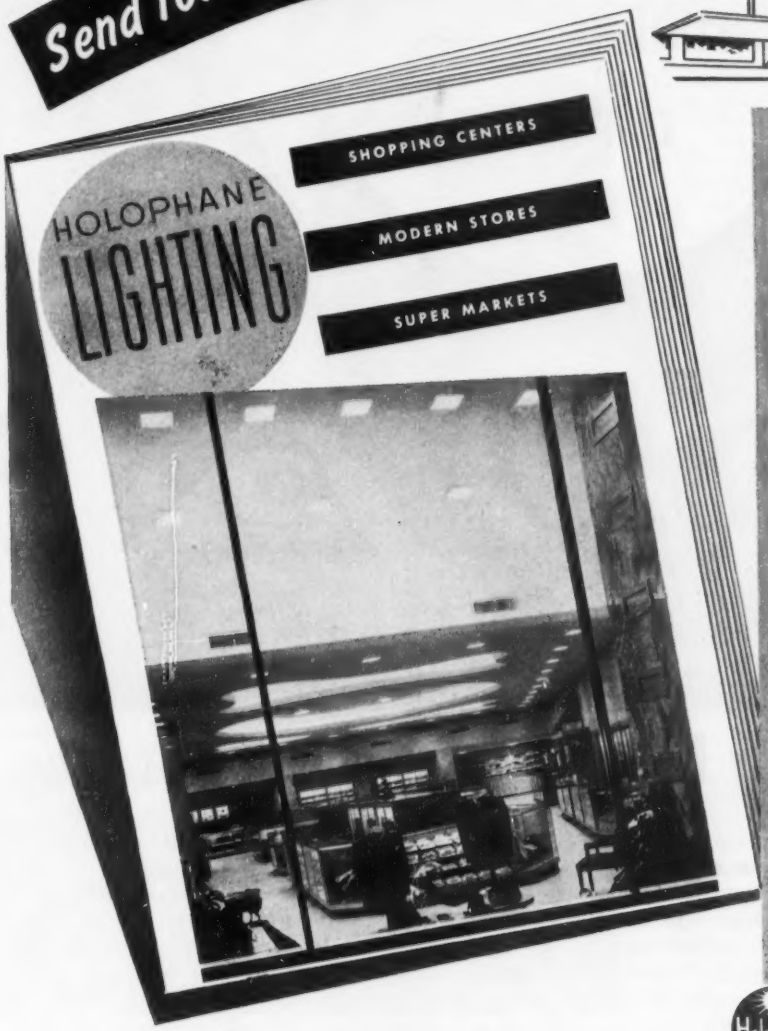

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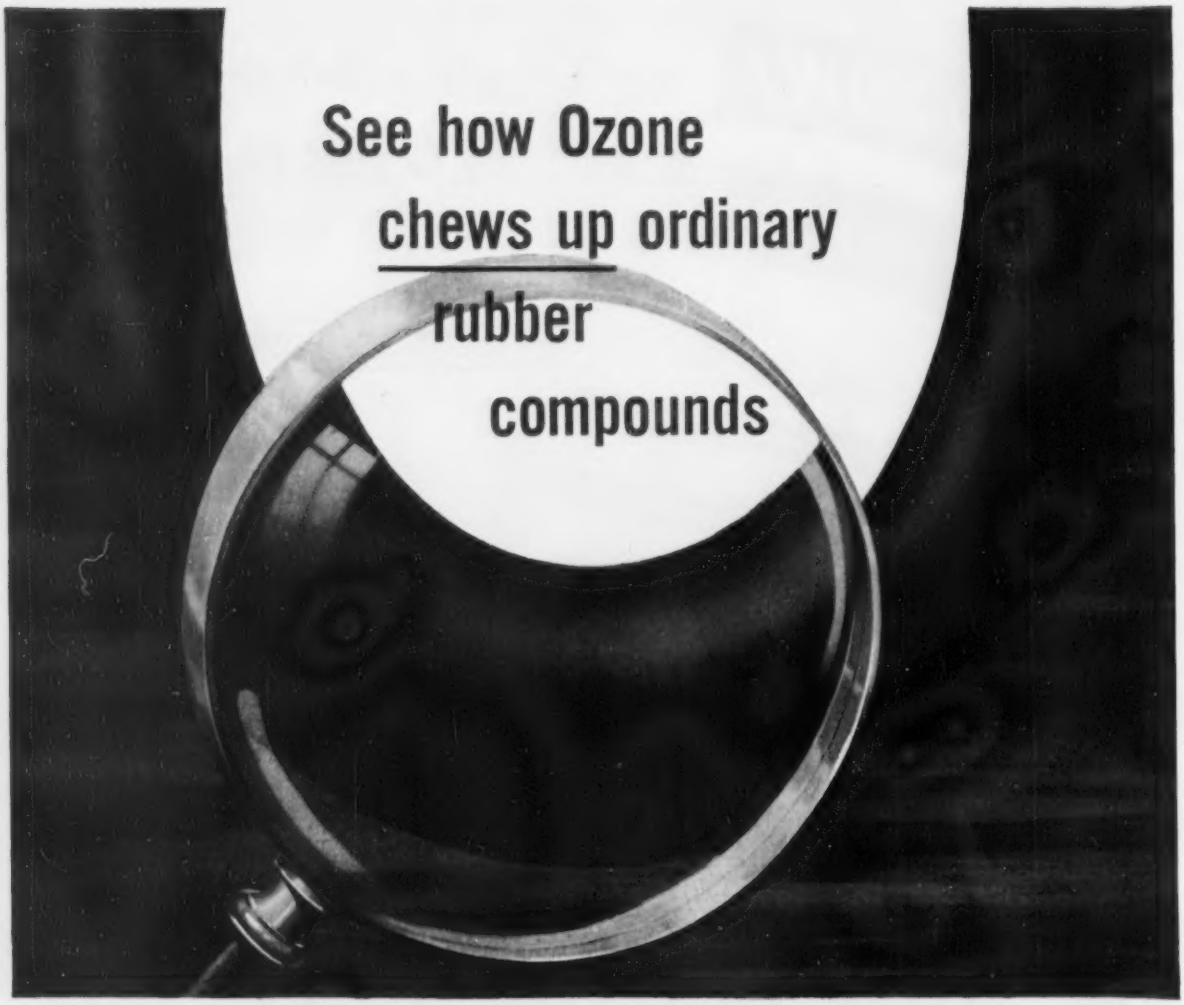
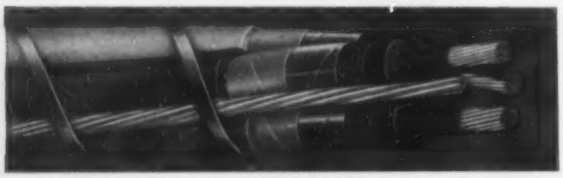


but not U. S. Grizzly Uskorona-insulated power cables

Here's an illustration showing how ozone can chew up a sturdy, rugged cable. This can never happen with United States Rubber Company's famous Grizzly® power cables, insulated with Uskorona® compound which prevents electrical failure caused by ozone (Uskorona-1 oil base compound and Uskorona-2 butyl base compound). Uskorona meets (and in many ways exceeds) the applicable IPCEA specifications for ozone-resistant rubber insulation.



U.S. Grizzly Uskorona-insulated Power Cable, 15,000 volts, Type RR, 3 conductor, shielded, Neoprene jacket

U.S. Grizzly ozone-resistant power cables are typical of the wires and cables "U.S." develops to meet the ever-increasing rate of expansion of electrical generation and construction. "U.S." is always ready with new products to meet new demands and is always developing, as a matter of policy, wires and cables that are more economical because they are more serviceable.

Send for free illustrated book giving full information about U.S. Electrical Wires and Cables for the Electric Utility Industry.

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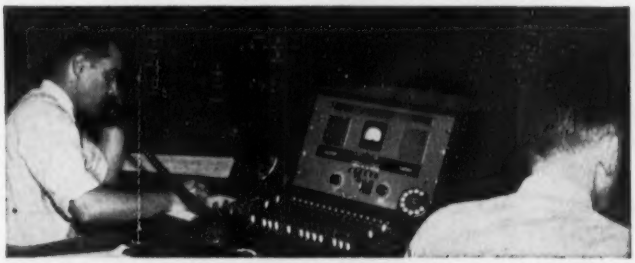
UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE & CABLE DEPARTMENT, ROCKEFELLER CENTER, NEW YORK 20, N. Y.

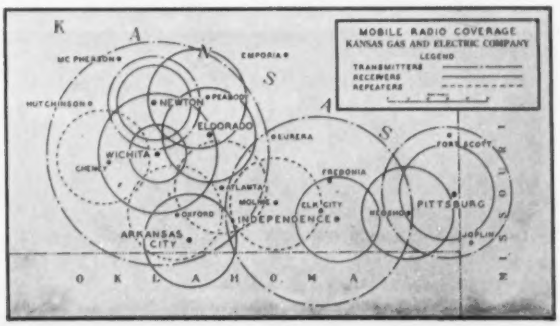
RCA 2-Way Radio "breaks the ice" for Kansas Gas and Electric

One of six 72/76-mc radio repeater stations used by Kansas Gas and Electric Co. to boost coverage. Located at a sub-station, unattended unit automatically picks up, retransmits traffic instantaneously



Main dispatch at central office in Wichita has instant communication with all operating points on the KG&E system plus 107 vehicles. Complete system diagram surrounds dispatcher and radio operator

107 RCA mobile radio units do many jobs—on line, relay and communication trucks, on signal-engineering and trouble cars, on agents' and line supervisors' cars. Spare units are stored at scattered points



"Several times ice storms have knocked down our telephone lines," says Mr. P. W. Mark, Communication Engineer for Kansas Gas and Electric Company. "Two-way radio was the only communication we had. It helped us trouble-shoot and make needed repairs in a hurry.

"Our system—which uses RCA *Fleetfone* equipment—was designed to function under the worst possible conditions," Mr. Mark reports. "With it we can rapidly get in touch with men in the field who are nearest the sources of trouble. It helps us sectionalize the line at fault. Our repair men can move directly from one job to the next. When crews need material, they can call and have it sent out immediately."

Kansas Gas and Electric uses its RCA 2-Way Radio system for many other functions where *time* is a factor. System operation, handling "hot work" permits, obtaining clearances on lines, meeting emergencies—are but a few of the many jobs it helps perform quickly and efficiently.

A series of 8 base stations, 6 repeater stations, and 2 control links makes up the Kansas Gas and Electric 2-way radio system. (See coverage map). Two of the base station transmitters are 250-watt, six are 60-watt. This combination gives the utility instant contact with 107 vehicles over the full area of its operations.

For day-to-day dependability—the kind of reliable communications you need when troubles develop—look into RCA 2-Way Radio for your next job. Our *free* literature will give you the advance information you need, and an RCA Communications Specialist will be glad to discuss long-range plans with you. *Mail the coupon—you incur no obligation.*

And remember, the RCA Service Company provides nation-wide service facilities.

Radio Corporation of America
Communications Equipment, Dept. D45
Building 15-1, Camden, New Jersey

Without obligation on my part, please send me

- ☐ Latest literature on RCA 2-Way Radio
- ☐ Brochure, "Electric Utility Microwave Systems"

Name_____ Title_____

Company_____ Address_____

City_____ Zone_____ State_____

☐ Please have an RCA Communications Specialist get in touch with me.

RCA **RADIO CORPORATION of AMERICA**
COMMUNICATIONS EQUIPMENT CAMDEN, N. J.

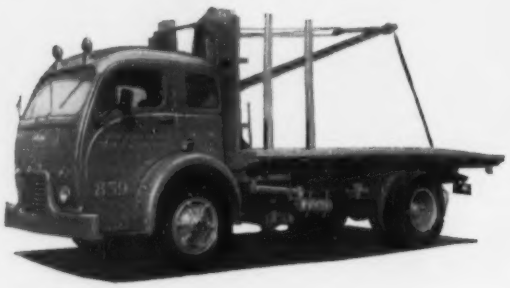
It takes all kinds of bodies, but . . .

THERE'S NOTHING LIKE THE WHITE 3000!

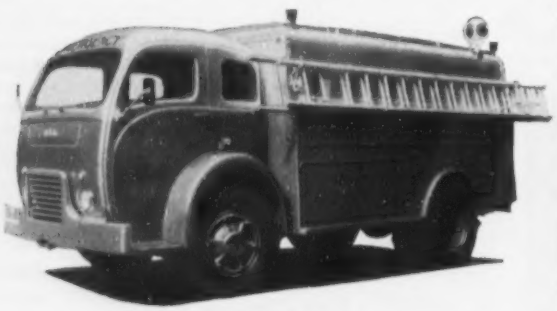
Here are only a few of the many different jobs the White 3000 is doing for the New York City Transit Authority . . . who want maximum maneuverability and space-savings for Manhattan's traffic-congested streets. They call on the White 3000—tomorrow's truck today!

DUMP TRUCK work handled by this White 3020 requires best maneuverability in congested areas, among elevated pillars, in garages. Used for coal, asphalt, sand, gravel and debris.

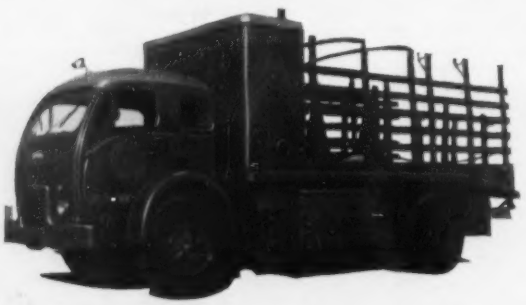
POWER DEPARTMENT handles crew and equipment with real savings in overall length with this White 3000 with extra crew compartment.



TRACK-LAYING UNIT—Less traffic and passenger service tie-up with this White 3000 used for track-laying on surface lines.



UTILITY WORK gets done faster by White 3000. Its modern design saves time in traffic and its compact styling saves garaging space and room on the streets.



CABLE REEL TRUCK—Plenty of body capacity and room for crew without going to longer overall length. Saves traffic time for power department.

Tips its cab to service

THE WHITE MOTOR COMPANY

Cleveland 1, Ohio

For more than 50 years the greatest name in trucks

Dean L. Potter

"Milwaukee Avenue has become the 'bright spot' of South Milwaukee with the installation of L-M's Uni-Ballast mercury vapor street lighting system," writes Mayor Dean L. Potter. "We are happy to report substantial savings in both installation and operation, and complete satisfaction with the system."

This system was put into operation July 2, 1952. Numerous other cities have since adopted this L-M-developed system because of its efficiency and economy.

L-M "Uni-Ballast" Lighting System A Proved Success Since 1952

Uni-Ballast is the series street lighting system for directly connected mercury vapor lamps. It eliminates individual ballasts; saves up to $90 per pole in labor and materials. Proved successful by numerous installations since 1952.

by **STACY STANDLEY**
Manager Lighting Sales
Line Material Company

Since July, 1952, when the first L-M Uni-Ballast system was put into operation, there has been a steady growth in interest in this revolutionary improvement in street lighting. Not only have more and more cities and utilities installed the system, but a number who have installed one system have ordered additional systems.

The L-M Uni-Ballast system offers marked economies. It eliminates individual ballasts, because 25 or more 400-watt mercury vapor lamps are operated in series on one Arctroller, L-M's static type regulator. These lamps would require a 25-kw regulator on a conventional series system.

The 25 lamps require only a single control station. Construction is simplified and more economical.

The Uni-Ballast system gives excellent cold-weather starting, because sufficient voltage is available to strike the lamp arcs. The maximum output voltage is limited by the saturation characteristics of the output transformer in the actual Arctroller circuit. When the Arctroller is connected to a mercury vapor lamp load, the voltage rises only to the value at which the lamp arcs strike. The Arctroller regulates faster than a moving coil regulator; surges are reduced to a minimum.

The system includes a voltage-sensitive time-delay relay, which prevents re-energization after outage until the lamps have cooled to the re-striking point. This protects lamp electrodes from unnecessary deterioration, minimizes bulb blackening, and assures greater lamp efficiency and maintains more uniform light levels. No half load starters required.

Power factor of the Arctroller is 94% to 100% between ½ and full load operation. This high power factor, and elimination of individual ballasts, saves about 12% in energy used.

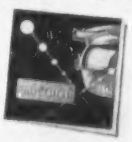
*"Uni-Ballast" and "Arctroller" are trademarks of Line Material Company.

Some Uni-Ballast Systems Now In Operation Or Being Installed

Collinsville, Ala.
Lodi, Calif.
Emporia, Kan.
Oxford, Kan.
Boonville, Mo.
Elsberry, Mo.
Warrenton, Mo.
Broken Bow, Neb.
Sylvania Plant, Batavia, N. Y.
Galion, Ohio
Cleveland, Okla.
Chamberlain, S. D.
Lexington, Tenn.
Nashville, Tenn.
Ripley, Tenn.
Rockwood, Tenn.
Houston, Texas
Lockhart, Texas
South Milwaukee, Wis.
Sun Prairie, Wis.
Thermopolis, Wyo.

Get the Whole Story on This L-M-Developed System

For complete information on the L-M Uni-Ballast system, ask the L-M Field Engineer to discuss it with you; or write Street Lighting Division, Line Material Company, Milwaukee 1, Wis. (a McGraw Electric Company Division).



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LINE MATERIAL *Street Lighting*

Spherolite Jr. Gives Good Lighting For Neighborhoods, Plus Interchangeability

L-M's Spherolite Jr. is a small, efficient luminaire for residential neighborhoods where narrow streets and wide light spacings prevail. It puts a high concentration of light in the main beam on the street, while shielding residential property.

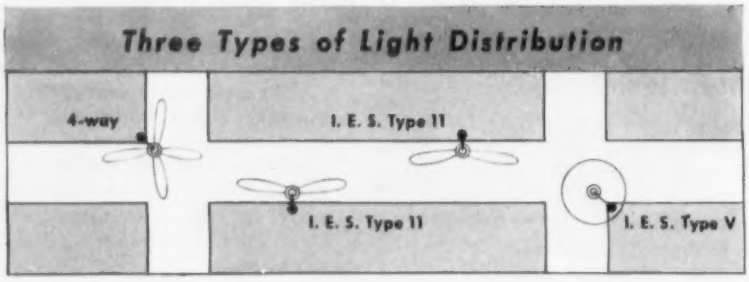
The unit is well designed and constructed to keep out dirt and moisture. Servicing is simple. Glassware may be removed by loosening the stainless steel V-Band holder, or reflector may be unlatched from the hood.

Complete Interchangeability

Spherolite Jr. fits both the 5000 volt Type A metal head and the wet process porcelain head. As traffic increases or the neighborhoods grows, the luminaire can be replaced with the larger standard Spherolite on the same heads. If you now have 600 volt multiple heads with radial bowls or open reflectors, you can replace these with the Spherolite Jr. without changing the heads.

Get Complete Information

Ask the L-M Field Engineer for details, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division). 125



One reflector provides these three types of distribution, with three types of glassware. To change patterns you just loosen one screw in the V-Band holder and replace the glassware. It's quick and easy. No extra reflectors to stock.

Spherolite is a registered L-M trademark.

Spherolite Jr. with asymmetric patterns provides maximum beam at high vertical angles to compensate for wide spacings. The symmetric Type V is designed with lower beam angles for intersection or center parkway lighting. Details are given in Bulletin SL-2. Ask the L-M Field Engineer or write us for a copy.

LINE MATERIAL

LM®

Street Lighting

L-M "Ovalite" Design Cuts Glare, Provides Uniform Light Distribution On The Street

The two major requirements for good high-intensity lighting in business and traffic areas are:

1. minimum glare from the light source;
2. uniform lighting on the street surface.

Seen against a dark background, every lighting unit has some glare. The problem is to reduce the glare to a minimum. Glare obscures the roadway and makes it difficult to see pedestrians or unlighted objects in the street.

The L-M Ovalite is so designed that glare is reduced, while at the same time light is distributed more evenly on the street surface. Here's how we do it:

The mercury vapor lamp is placed so that the light center is about 2½ inches above the bottom edge of the reflector. Thus, when you are driving down the street, you don't look directly at the lamp.

The reflector is so designed that it distributes the light evenly on the glassware, so that no one area receives a majority of the light.

Vertical prisms on the inside of the glass refractor raise the angle of the light emitted from the refractor, directing it to give uniform surface brightness on the glassware, and at the same time distributing it evenly over the street area.

The result, so far as glare is concerned, is seen by comparison of the two photographs at the top of the page. In the left-hand unit, the Ovalite, light is distributed evenly from all parts of the glassware. The right-hand unit, which does not have the same efficient optical system, has a hot spot along the top edge of the glassware, which causes glare and uneven light distribution.

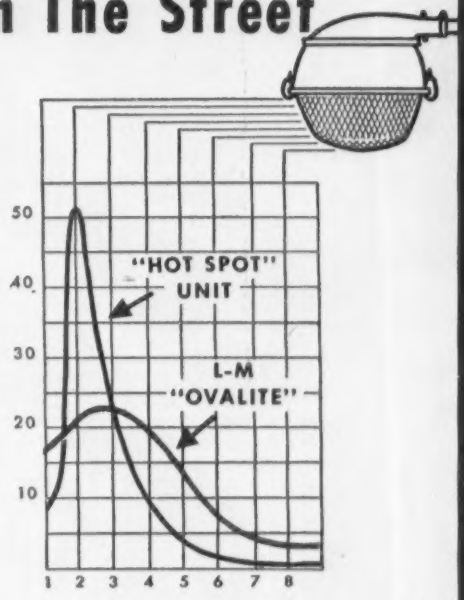
With its freedom from glare and its uniform distribution, the Ovalite gives greater safety and more efficient use of the light. Its optical system provides the wide distribution needed for business streets, shopping areas, and boulevards.

The Ovalite has many other good features—asbestos-covered internal wiring, strong construction, a double-hinge latch so you can swing the glassware down from either side. That makes servicing quick, easy, and safer.

Get The Whole Story

Ask the L-M Field Engineer for the "Ovalite" Bulletin—or write Line Material Co., Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

LINE MATERIAL
Street Lighting



Tests Demonstrate Ovalite's* Uniform Brightness Distribution

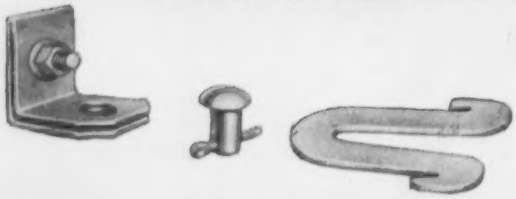
To determine the relative brightness distribution of the "Ovalite" and a "hot spot" luminaire, measurements were made of the brightness of successive strips of the surface of each luminaire. Readings were taken in the main beam of both luminaires. The chart above shows that the brightness of the "Ovalite" is much more even, while the other luminaire peaks up, especially near the top of the glassware, which accounts for the hot spot seen in the right-hand picture at the top of the page. 121

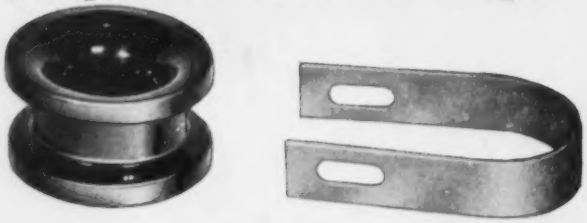
*"Ovalite" is a Line Material Company trademark.

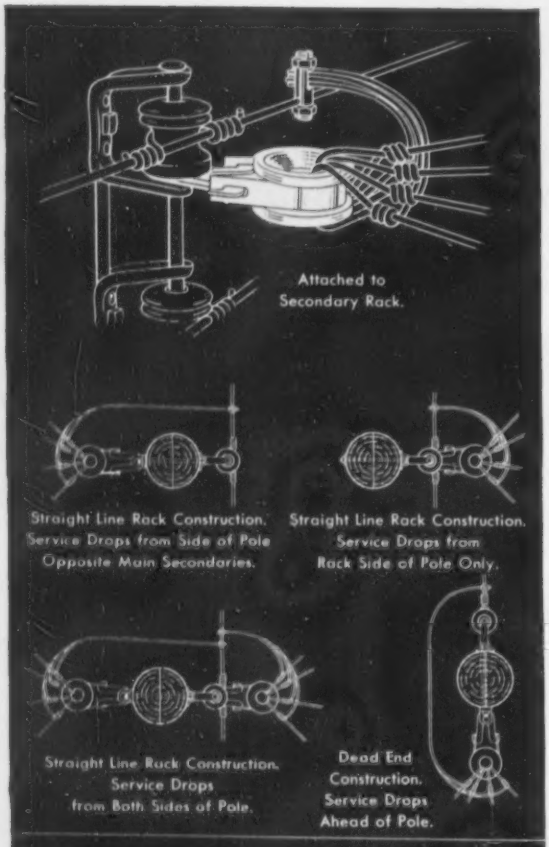
LINE CONSTRUCTION BLUEPRINTS

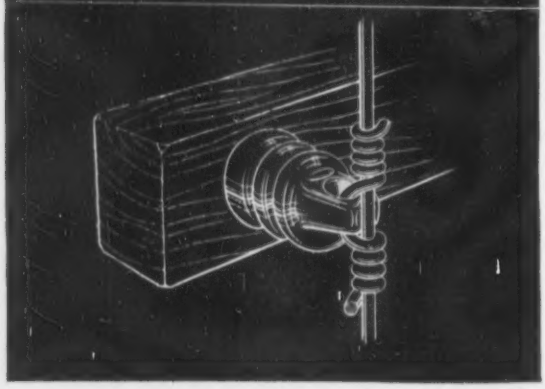
HOW SOME UTILITIES ARE MAKING CONSTRUCTION WORK EASIER . . .
IN WAYS THAT MAY BE HELPFUL AND USEFUL TO YOU.

L-M's Versatile Take-Off Insulator Simplifies Service Drops






Attached to Secondary Rack.
Straight Line Rack Construction. Service Drops from Side of Pole Opposite Main Secondaries.
Straight Line Rack Construction. Service Drops from Rack Side of Pole Only.
Straight Line Rack Construction. Service Drops from Both Sides of Pole.
Dead End Construction. Service Drops Ahead of Pole.

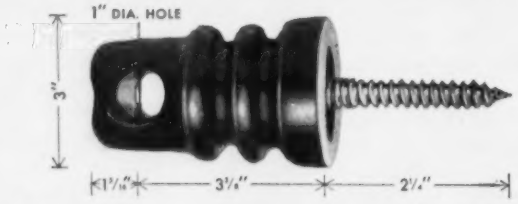


With the L-M Take-Off Insulator, it's much easier to install service drops. The Take-Off eliminates overloading of secondary rack spools and tangled connections. May be attached to secondary racks or directly to the pole. Simplifies installing, replacing, removing, or changing service drops; simplifies the operation when main conductors are replaced.

Easily used on either old or new construction. On old construction the yoke is just slipped under the rack spool, band is placed around insulator and snapped onto the yoke. Then service wires are transferred to the porcelain ring. Blueprints at left and below show some suggested uses.

Steel parts are heavily galvanized. Wet-process porcelain insulator has a 4" outside diameter with a 1½" diameter center opening. Available for pole or rack mounting; pole face attachment and insulator available separately. Ask the L-M Field Engineer for a sample.

L-M INSULATED PRIMARY LEAD BRACKET



A variety of applications. Many utilities find it particularly useful on crossarms to train primary and series street lighting leads. Wet-process brown glazed porcelain insulator 4 11/16" long, 3" diameter, with 2¼" No. 22 galvanized-steel wood screw.

Many L-M Construction Materials to Help Solve Your Problems

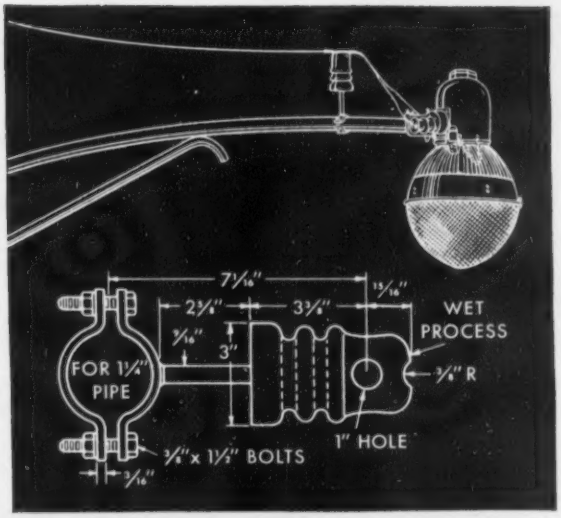
L-M offers a wide variety of Line Construction Materials and Specialties to help simplify your construction jobs. Ask the L-M Field Engineer for literature; or write Line Material Company. Explain your problem and we'll be glad to make suggestions. Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

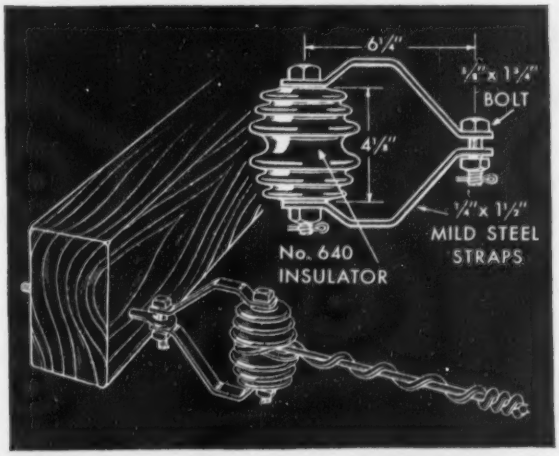
LINE MATERIAL

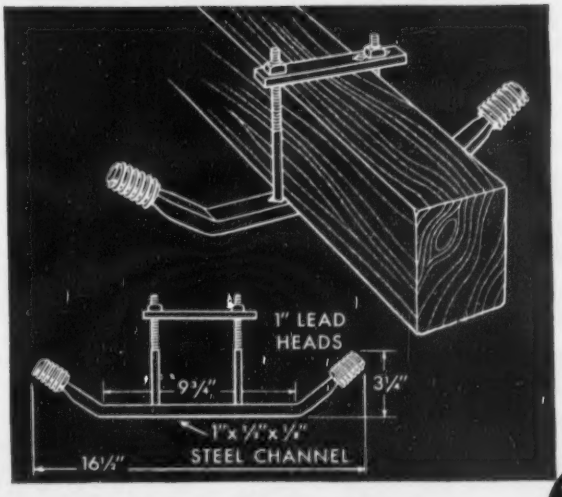
Line Construction Materials

LINE CONSTRUCTION BLUEPRINTS

HOW SOME UTILITIES ARE MAKING CONSTRUCTION WORK EASIER . . .
IN WAYS THAT MAY BE HELPFUL AND USEFUL TO YOU.



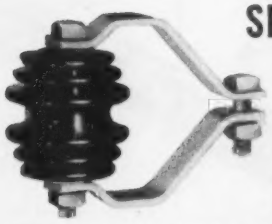




DUPLEX CABLE BRACKET

Cat. No. BA209X3

Installed on a 1¼-inch pipe bracket to provide a rigid insulated support for the luminaire end of high voltage series duplex cable. Simplifies street lighting installations.



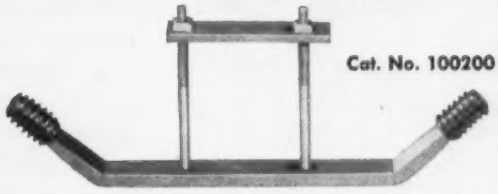
SPLIT DEAD END CLEVIS

with Offset End

Clevis-Cat. No. 1983L
Insulator-Cat. No. 640

Provides a swinging type clevis for dead ends and angles on primary lines up to 4800 volts delta and 2400/4160 volts wye. The cotter pins keep the nuts from turning off of the bolts.

CROSSARM DISTRIBUTION BRACKET



Cat. No. 100200

These brackets carry wires vertically from arm to arm, or horizontally from one end of the arm to the other. Made of heavy steel channel, mounted by two ⅜" x 6" machine bolts threaded 3", and ¼"-thick back strap. For crossarms from 3¼" x 4¼" to 4" x 5".

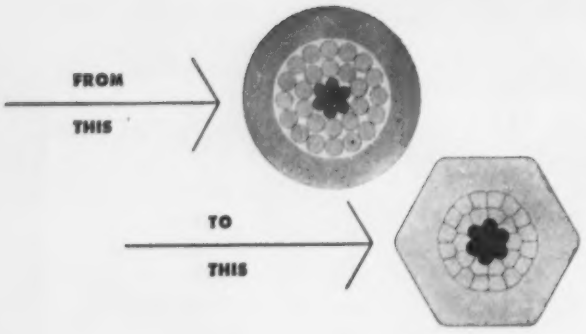
Do you have a line construction problem?

These are just a few of thousands of L-M line construction specialties. If you have a line construction problem, let us know. We may have standard or special items in stock that will solve it. Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division). 114

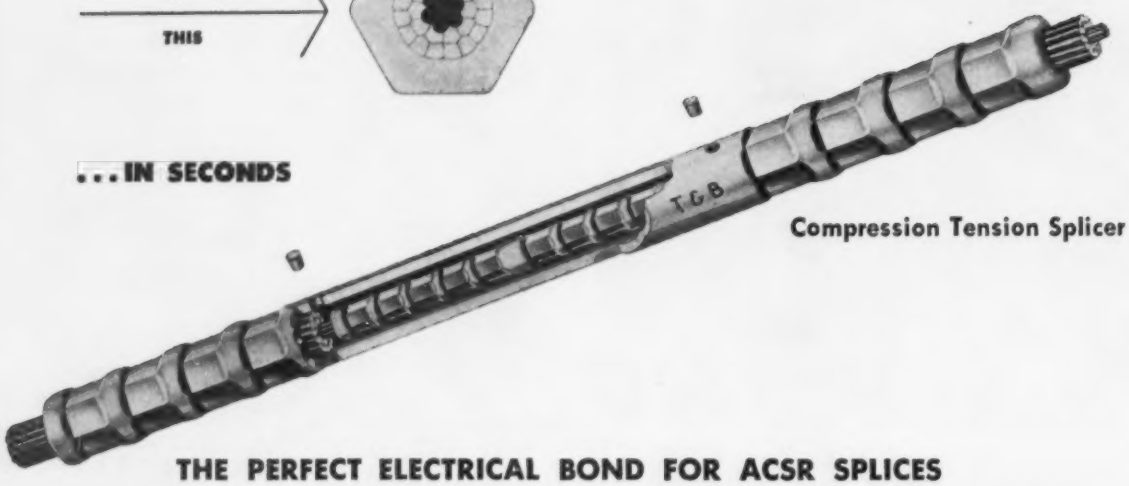
LINE MATERIAL

Line Construction Materials

T & B METHOD



. . . IN SECONDS



Compression Tension Splicer

THE PERFECT ELECTRICAL BOND FOR ACSR SPLICES

The T & B METHOD tension splicer for ACSR provides greater electrical conductivity than an equal length of cable. Fabricated from pure extruded aluminum tubing having electrical and thermal properties equal to the cable, the contact surfaces are serrated and factory coated with an oxide inhibitor. Positive, clean electrical and mechanical contact with the cable is assured.

The steel core sleeve is made from drawn seamless tubing, serrated and coated to provide tension in excess of the breaking strength of the steel core.

Both sleeves are easily installed with T & B METHOD light-weight, portable tools. Under high pressure, the hexagonally shaped dies compress the joint into a homogeneous mass, abrading aluminum oxide film from each cable strand.

The result: a streamlined, light-weight splice that satisfies all requirements for electrical and mechanical efficiency.

The standard practice of using an oxide inhibitor on all aluminum joints is recommended on T & B METHOD aluminum connections. No joint compound is required to obtain maximum electrical efficiency.

Investigate the complete line of T & B fittings for ACSR, aluminum cable and copper cable installation — they offer you important savings in time and installation costs. Write for your free copy of T & B Bulletin 70.

LOOK FOR THIS SIGN — AUTHORIZED DISTRIBUTOR T&B ENGINEERED

IT'S THE MARK OF AN AUTHORIZED T & B DISTRIBUTOR

The complete line of T & B fittings for conductors and raceways is sold only by recognized electrical wholesalers. It's our way of assuring you the service and savings of a friendly local source. Call him for all your electrical needs.

T32

THE THOMAS & BETTS CO.

INCORPORATED

14 Butler Street • Elizabeth 1, New Jersey

Thomas & Betts Ltd., Montreal, P.Q., Canada

MANUFACTURERS OF FINE ELECTRICAL FITTINGS SINCE 1898

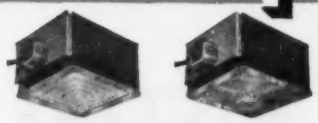
Guth

the complete line of fluorescents and incandescents

When you specify GUTH Luminaires, you get the benefit of more than a half-century's experience in pioneering better lighting. We make good specialized equipment for every lighting need...all *precision-planned* for economical installation and maintenance:

FLUORESCENT: Commercial and Industrial; Glass diffused, Eggcrate shielded, totally indirect, luminous indirect, recessed troffers and exposed lamp types.

INCANDESCENT: Commercial and Industrial; indirect, direct and semi-indirect types; also high bay reflectors, exit and utility lighting units.



"ALL-SQUARE"...for recessing. One-piece die-cast frame. Light-leakproof. Widespread or concentrating lens...sizes 6½" sq., 8" sq. & 12" sq. PRE-WIRED. Removable top, and drop hinge bottom for servicing from above or below. Catalog 49.

▲ "ALL-SQUARE"

SEELUX ...totally indirect open bottom Luminaire for for Silver Bowl Lamps, with modern ALZAK concentric louvres; for stem suspension or close mounting. Bulletin 864.

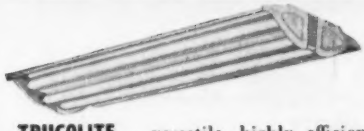
▲ SEELUX®

ARISTOLITE ...hinged glass panels swing open for easy cleaning from floor with handy servicing tool. Also with center Eggcrate louvres. For 2, 3 or 4 40-watt or 2 or 4 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Write for Bulletins 812 and 820.

▲ ARISTOLITE®

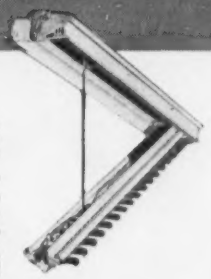
PEERLITE ...the new, ultra-modern fixture offering great flexibility. Forms any pattern—T, H, □, +, I. 20% uplight. Top plates available for 100% downlight. For 2, 3 or 4 lamps—4′ or 8′ long. Supplied with any type of louver or glass diffuser you wish. (Shown with new GrateLite** Louver-Diffuser.) Bulletin 911.

▲ PEERLITE *



TRUCOLITE ...versatile, highly efficient, semi-direct type; can be used open, with Eggcrate louvres or diffusing glass bottom. For 2, 3 and 4 40-watt lamps...also 2 and 4 4-ft. or 8-ft. SLIMLINE lamps. Ceiling or suspension, unit or continuous mounting. Bulletins 814 and 852.

▲ TRUCOLITE®



GUTHLITE ... the revolutionary "Jacknife" Hinge Luminaire that swings down for easy relamping or cleaning right from the floor! For 2 40- or 2 85-watt or 2 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Simplest fixture to install. Bulletin 845.

▲ GUTHLITE®

"V" CORRIDOR UNIT...with GrateLite** Louver-Diffuser. Fills wide hallways and corridors with practical, wall-to-wall light. Lamps shielded by easily maintained GrateLite. Models: 4′ & 8′ for 1 or 2 lamps.

▲ "V" CORRIDOR UNIT

WYTE-LINER...white inside and outside (takes gloom off ceiling). AIRFLOW channel for longer ballast life. Reflectors 300° Permalux or Porcelain Enamel. Made in 2 and 3 40-watt, 2 85-watt, and 4- and 8-ft. SLIMLINE lamps. Easy to install and clean. Catalog 48.

▲ WYTE-LINER

"LITE-BLOX" RECESSED TROFFERS... for 1, 2, 3 or 4 lamps: 20-, 40-, 85-watt, or 4-ft., 6-ft., or 8-ft. SLIMLINE. Exclusive end KO's provide exact 48.0"; modular design for unlimited patterns. Wide variety of shielding and diffusing glass panels available; also ALZAK reflectors if desired. Bulletin 869.

▲ "LITE-BLOX" RECESSED TROFFERS

LEADERS IN LIGHTING
Guth
SINCE 1902

GUTH 4-FT. SLIMLINE available in every GUTH fluorescent fixture

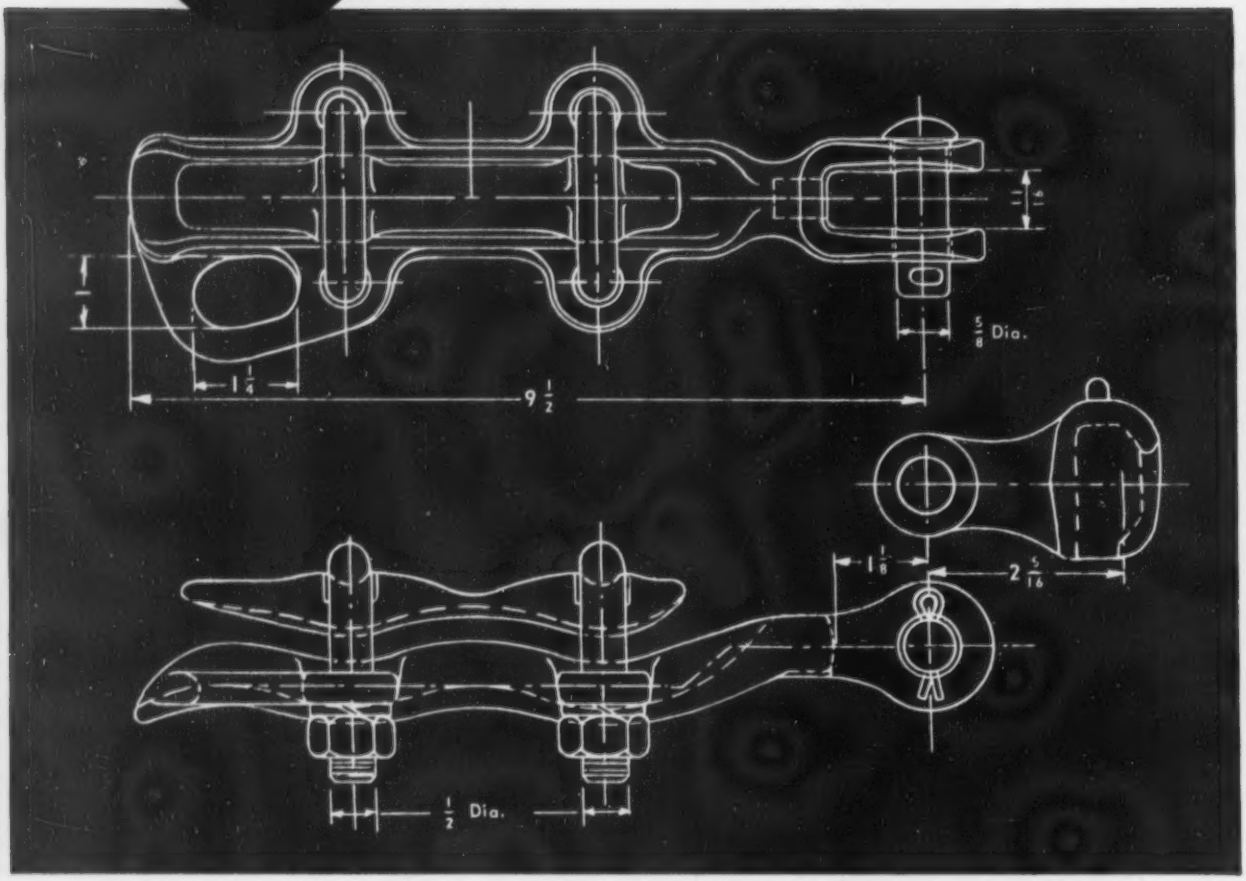
- no starters or starter troubles!
- easy to handle Single-Pin lamps!
- light in two steps almost instantly!

* Trademark
**U.S. & Can. Pats. Pend. Trademark Registered

THE EDWIN F. GUTH CO. / ST. LOUIS 3, MO.

Newly Developed...

BTC ALUMINUM & STEEL



IT'S AVAILABLE NOW . . . a BTC Strain Clamp developed for distribution, light transmission and substation use on all conductor within its bore size range, including Copper, All-Aluminum, 18 x 1 and other A.C.S.R. Conductors. This new lightweight clamp is amply strong . . . follows advanced clamp design. It incorporates the superior features found in the BTC standard line of forged steel and aluminum (MPL) Strain and Suspension Clamps.

The corona-free beaded aluminum or steel body of the new clamp is drop-forged for greater strength. The smooth die-forged wave form cable seat develops adequate slip strengths. The 1" x 1¼" loop is of ample size to accomodate come-along hook or shackle. All steel parts are hot-dip galvanized to give longer service.

The point of first conductor-to-clamp contact in the BTC Straight Line Clamp is well within the bell-mouthed clamp end. The section of conductor subject to vibration bending is carried over a generous radius and length and is free from clamping pressure which is first applied very lightly and gradually increased into the high pressure area under the U-Bolts. The design prevents destructive localized concentration of tension and vibration-bending stresses and insures against high clamping pressure damage to conductor at clamp mouth.

The assembly may be supplied with a drop-forged Socket Adapter. Use of Copper or Aluminum liners is recommended in steel clamps.

Next time you order from your insulator manufacturer, specify BTC Straight Line Clamps. They are an important part of the complete BTC line of forged transmission line hardware.

STRAIGHT LINE CLAMP

CATALOG NUMBER	BODY MATERIAL	ADAPTER	BORE SIZE		ULTIMATE STRENGTH
			MIN.	MAX.	
5100	Steel	None	.46	.90	15,000 lbs.
5148	Steel	Socket	.46	.90	15,000 lbs.
5400	Aluminum	None	.46	.91	12,000 lbs.
5448	Aluminum	Adapter	.46	.91	12,000 lbs.

Drop Forged BTC Hi-Line Hardware

Sold Through Your Insulator Manufacturer Only

The BREWER-TITCHENER Corporation

Cortland · New York

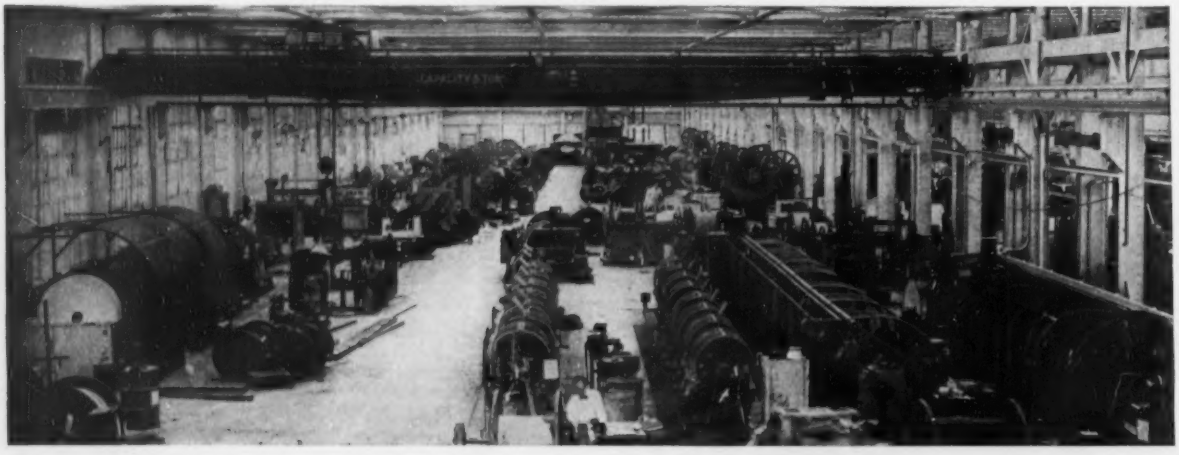
INCREASING USE OF ELECTRICITY CALLS FOR MODERN DISTRIBUTION SYSTEMS

General Electric's expanding wire and cable facilities and services can help you handle new or greater loads

The load doubles every ten years—say competent authorities. This load growth means, of course, that bigger and more flexible distribution and generation systems will have to be planned, installed, and maintained. To assist you, General Electric has expanded its facilities, and is prepared to help you and your customers in the application, use, and maintenance of modern distribution systems.

1 PLANNING AND APPLICATION.

G-E wire and cable specialists are ready to help your customers select and plan cable systems with the capacity and flexibility needed for their growing loads.



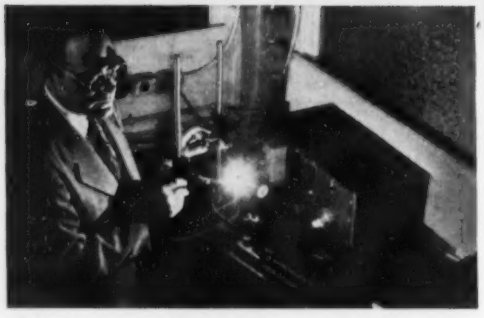
2 WIRE AND CABLE AVAILABILITY.

General Electric is adding a new wire and cable plant to its facilities in Bridgeport, Connecticut, to continue to supply you and your customers with products on which distribution and generation systems depend. This new plant will be able to produce more cable faster, and will supply you with new cable products to meet new needs.

If you want help NOW . . . just call your G-E wire and cable specialist, or write Section W124-427, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

You can put your confidence in—

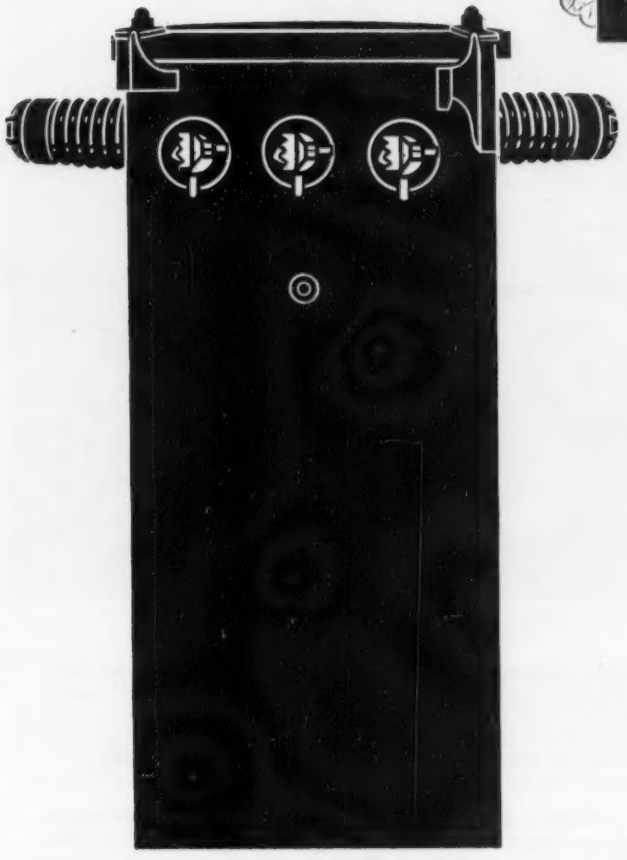
GENERAL ELECTRIC



3 MAINTENANCE OF CABLE SYSTEMS.

General Electric's test facilities help minimize maintenance problems. Thorough production-line testing, coupled with research and developmental testing, give you wire and cable products with longer life and coordinated insulation levels. (This spectrographic test for copper conductor purity is one example of G.E.'s laboratory testing.)

Kuhlman Distribution Transformers seldom require maintenance



Because of their design and construction, Kuhlman Distribution Transformers help utilities provide a steady and reliable source of power for American homes at a minimum of maintenance. Construction is sturdy and rigid. Tanks are fabricated of heavy gauge copper bearing steel, tested, and weatherproofed. For voltages through 4800 V., "Quick-Grip" clamp type insulated bushings simplify installation. Tap changer handle extends above oil level so adjustments can be made easily.

The major portion of Kuhlman pole type Distribution Transformers incorporate the well known Bent Iron Core. This core, permitting the flux path to follow the grain of the steel, utilizes the best qualities of cold-rolled oriented silicon steel. Considerable weight savings, reduction in core loss, and low exciting current result.

By achieving balanced design through the Bent Iron Core and other features, Kuhlman Distribution Transformers are engineered to provide exceptionally good voltage maintenance and high efficiency under varying load conditions. Wide oil ducts permit good oil circulation through the windings, maintaining relatively uniform coil temperatures. Kuhlman Transformers, of course, are vacuum treated to insure against trapped air.

Kuhlman Distribution Transformers are available in single and three phase ratings from 3 to 500 KVA. For complete information, write for Bulletins CS 201, CS 202 and CS 203. Kuhlman also manufactures Power, Dry Type, Saf-T-Kuhl, CSP, Subway and Series Street Lighting Transformers. Write for bulletins on these types as well.

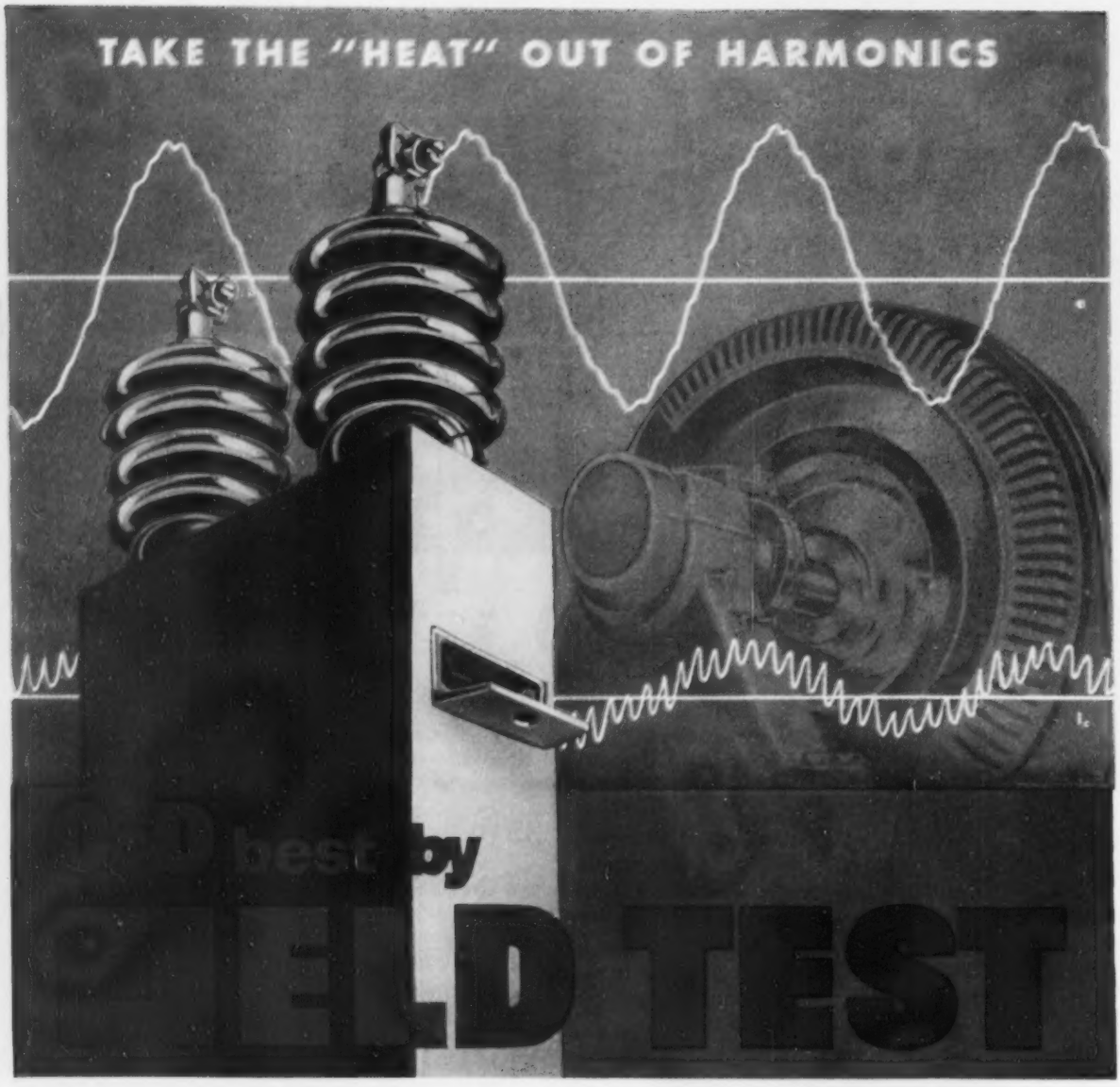
152-T

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY



e-wave form of voltage generated by an open slot type alternator of small kilovolt-ampere capacity.

I_c-capacitor current. The seventeenth harmonic in the voltage variation produces a pronounced seventeenth harmonic in the Ic variation.

C-D capacitors are especially designed to withstand the recognized damaging effects of high harmonic component currents associated with many of the earlier type alternators.

Again, C-D's built-in margin of safety permits the highest degree of trouble-free service under the most severe operating conditions.

We'll be glad to have one of our field engineers graphically demonstrate the dollar-saving economy utilities have enjoyed with their C-D capacitor installations. And why only C-D pre-delivery quality tests all power-factor capacitors at full rated voltage. Cornell-Dubilier Electric Corp., Dept. D-54, South Plainfield, New Jersey.

There are more C-D capacitors in use today than any other make

CONSISTENTLY DEPENDABLE

CORNELL-DUBILIER CAPACITORS

FOR POWER-FACTOR IMPROVEMENT

PLANTS IN SOUTH PLAINFIELD, N. J.; NEW BEDFORD, WORCESTER AND CAMBRIDGE, MASS.; PROVIDENCE AND HOPE VALLEY, R. I.; INDIANAPOLIS, IND.; SANFORD AND FUQUAY SPRINGS, N. C.; SUBSIDIARY: THE RADIART CORPORATION, CLEVELAND, O.

"POT HOLDER"- Industrial Style

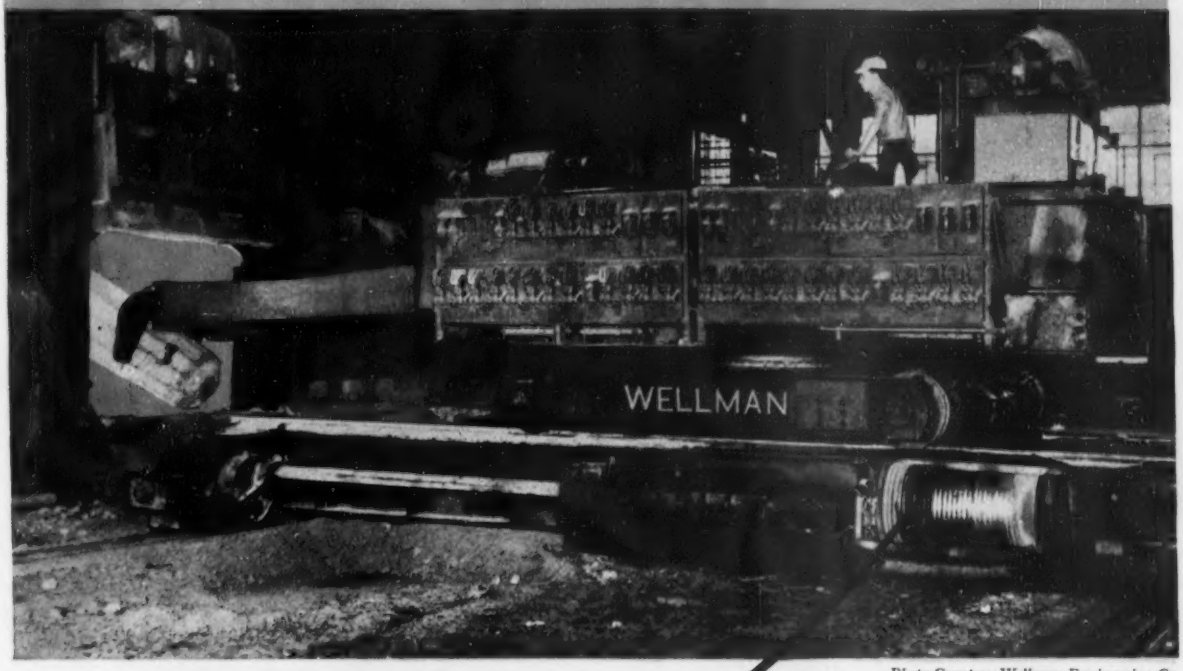


Photo Courtesy Wellman Engineering Co.

This is the industrial equivalent of the domestic pot holder. The charging and drawing machine picks up heavy ingots and puts them into and removes them from the furnace.

Overhead trolleys, as well as third rails, are frowned upon as sources of power because of safety reasons and so the steel mill wisely chose TIREX Cables for the important job of supplying electric power to this machine.

The user knows better than anyone else how important this machine is to his operation. So he uses cured-in-lead TIREX to insure the dependable operation of this charging machine. The cable is subjected to heat, to flying sparks, to oil, abrasion and other harmful agents. It is reeled and unreeled all day long. Even this doesn't bother the Selenium Neoprene Armor.

Isn't the fact that this steel mill depends upon TIREX Cables ample evidence of their superiority? Doesn't this mean you could profit by their experience? We think so, too. Why don't you specify and be sure you get TIREX for every type of portable cord or cable operation? You will not be sorry you placed your faith in TIREX.

Simplex WIRES & CABLES

TIREX CORDS AND CABLES *are made only by the*

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Massachusetts

Amcreco
Lowry Process
Creosoted Products

POLES
PLANK
CROSSARMS
CONDUIT

You can reduce maintenance costs and build extra years of service into your lines by installing Amcreco pressure treated poles. Amcreco pressure treatment with creosote oil preserves the natural strength of the wood—armors the pole against insects and fungi—assures greater strength and dependability throughout the life of the pole.

Our nearly fifty years of experience in creosote treatment and our strategically located facilities are at your service. Let us discuss your next requirements with you.

AMERICAN CREOSOTING COMPANY

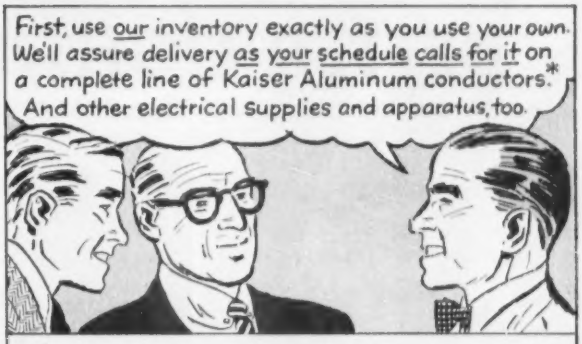
COLONIAL CREOSOTING COMPANY INCORPORATED — AMCREO — GEORGIA CREOSOTING COMPANY INCORPORATED

GENERAL SALES OFFICE—CHICAGO, ILLINOIS
10 FIELD SALES OFFICES TO SERVE YOU

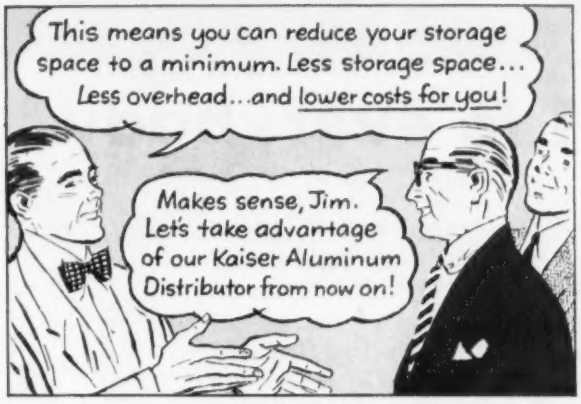
"Can't we cut overhead costs?"

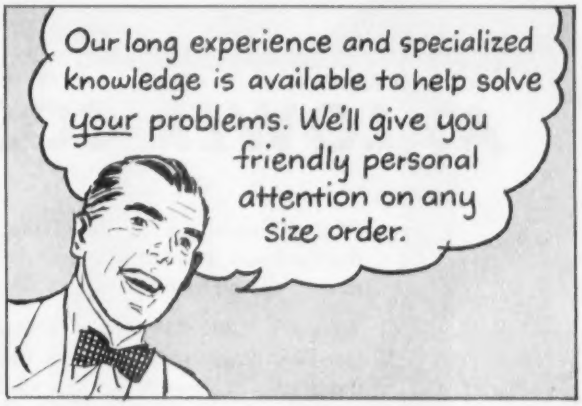
Our overhead costs are too high, Jim, and getting higher. We've got to do something about it now!
You can come over right away? GOOD!

This is Mr. Jones, a Kaiser Aluminum distributor. Thought he might be able to help us.
But how can a distributor cut our overhead costs?
Fact is, that's one of our biggest services. Let me explain.


First, use our inventory exactly as you use your own. We'll assure delivery as your schedule calls for it on a complete line of Kaiser Aluminum conductors.* And other electrical supplies and apparatus, too.

* Stocks include the largest range of sizes and constructions of covered aluminum conductor in the industry.


This means you can reduce your storage space to a minimum. Less storage space... Less overhead...and lower costs for you!
Makes sense, Jim. Let's take advantage of our Kaiser Aluminum Distributor from now on!

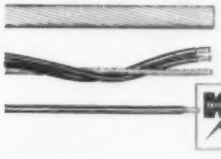

Our long experience and specialized knowledge is available to help solve your problems. We'll give you friendly personal attention on any size order.

KAISER ALUMINUM DISTRIBUTORS CONVENIENTLY LOCATED TO SERVE YOU:

Line Material Co.
General Electric Supply Co.
Westinghouse Electric Supply Co.
Capital Electric Supply
Central Electric Supply Co., Inc.
Champion, Inc.
City Electric Distributors, Inc.
Corpus Christi Hardware Co., Inc.
Crescent Electric Supply Co.
Dauphin Electrical Supplies
Dutton-Lainson Co.
Electrical & Mechanical Supply Corp.
Eoff Electric Co.
Evans Electrical Supply, Inc.
Florida Electric Supply, Inc.
George H. Wahn Co.
Hampden Electric Supply Co.
Hunzicker Brothers
Interstate Electric Co. of Shreveport, Inc.
Mack Electric Supply Co.
Maydwell & Hartzell, Inc.
Nelson Electric Supply Co.
Price Electric Co.
Russell Belden Electric Co.
S. M. Supply Co., Inc.
Southern Minnesota Supply Co.
Stuart C. Irby Co.
Stubbs Electric Co.
Tafel Electric & Supply Co.
The Korsmeyer Co.
Virginian Electric, Inc.
Waltrip Electric Co.

GET IN TOUCH with your nearby Kaiser Aluminum distributor *now*. He makes available top-notch engineering services, including the famed Field, Engineering and Laboratory services of Kaiser Aluminum. Refer to the list at the left and your local telephone directory. Kaiser Aluminum & Chemical Sales, Inc., Oakland 12, California.

Kaiser Aluminum



The Nation's Largest Supplier of Aluminum Weatherproof Conductor and Triplex

the P&K story

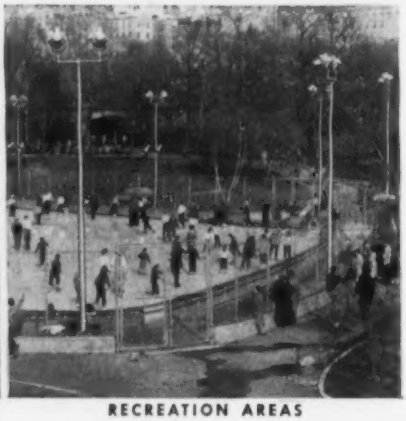
HIGHWAYS

DRIVE-INS

BETTER LIGHTING everywhere

SHOPPING CENTERS

PARKING AREAS



RECREATION AREAS

AT LOWER COST to everybody

Pfaff & Kendall, originator of the Seamless Tapered Aluminum Lighting Standard and Tapered Elliptical Arm, is now producing designs and types to meet any highway, road, area, bridge and traffic signal requirement.

Wherever P & K All-Aluminum Standards and Brackets are specified and installed, the story is the same: *Fewer technical problems . . . rapid, easy installation . . . greater lighting efficiency . . . and the kind of economy you can figure in actual dollars!*

P & K All-Aluminum Standards and Brackets are always the wisest choice . . .

LIGHT WEIGHT for lowest cost installation.
NEGLIGIBLE CORROSION for longest service.
NO PAINTING means large, year-after-year savings.
SALVAGEABLE, RE-USABLE in event of knockdown.

WRITE FOR LATEST P & K CATALOG... and use the P & K planning and advisory services without obligation.

Pfaff & Kendall
84 Foundry Street
Newark 5, New Jersey

NEW

No. 53-XPJ Nicopress Tool with *Three Grooves*

Accommodates Nicopress Sleeves

FOR COPPER

1 solid, 1 seven strand, 2 solid, 2 seven strand, 2 three strand, 3 solid, 4 solid, 4 seven strand, 4 three strand, 6 solid, 6 seven strand, 8 solid, 8 seven strand, 3 No. 10, 3 No. 8.

FOR COPPERWELD

4A, 6A, 8A, 6C, 8C, 6D, 8D, 9½D, 3 No. 10, 3 No. 12, 4 solid, 6 solid, 8 solid, 10 solid.

FOR ALL-ALUMINUM

2 solid, 2 seven strand, 4 solid, 4 seven strand, 6 solid, 6 seven strand, 8 solid.

FOR AMERDUCTOR

8SCP or SCG, 10SCP or SCG, 12SCP or SCG.

Write for descriptive folder.

Nicopress Sleeves and Tools Patented in U. S. and Foreign Countries. "Nicopress" Registered in U. S. and foreign countries.

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.: N. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA

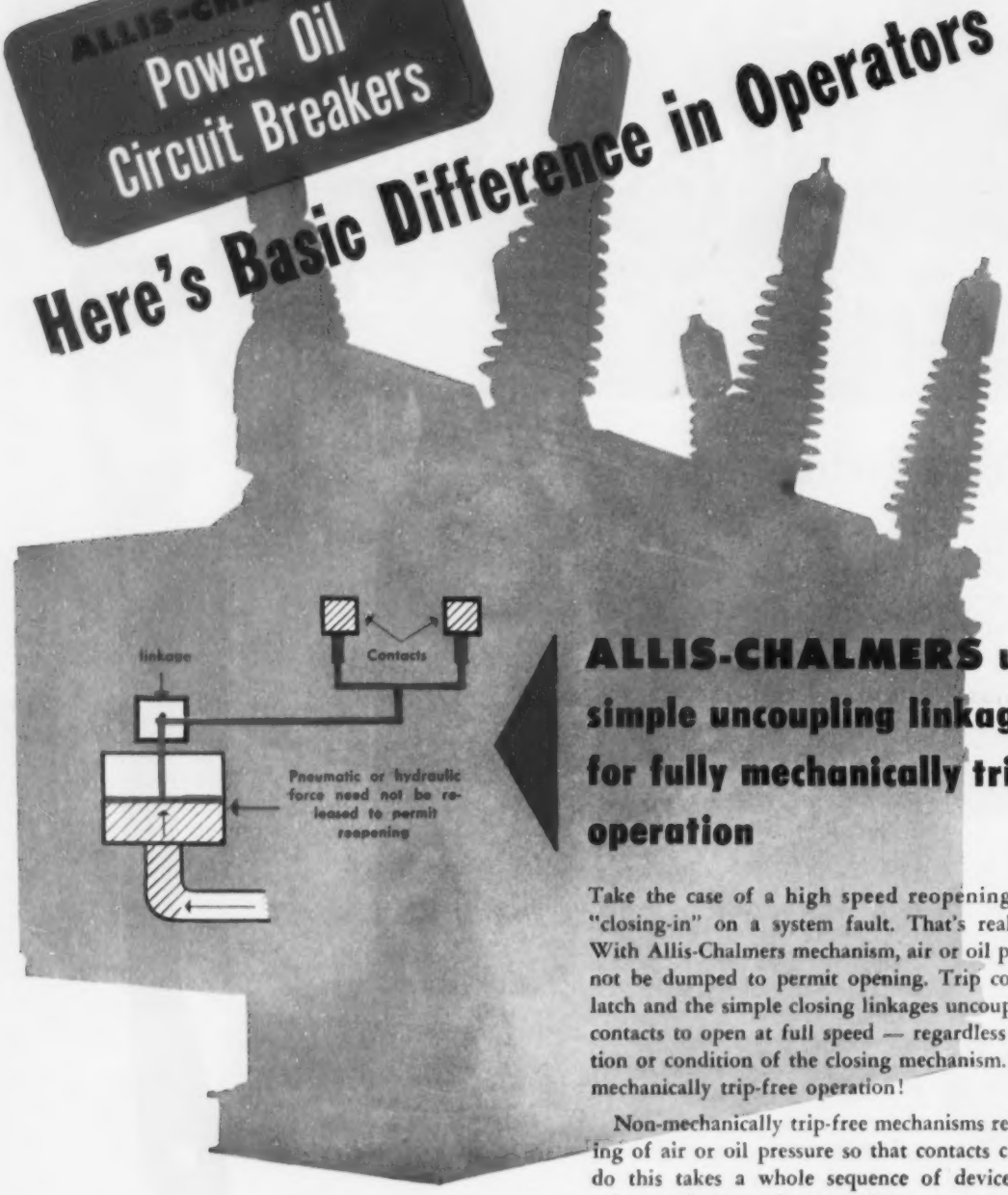
Export Distributors: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY

ALLIS-CHALMERS

Power Oil Circuit Breakers

Here's Basic Difference in Operators



ALLIS-CHALMERS uses simple uncoupling linkage for fully mechanically trip-free operation

Take the case of a high speed reopening following "closing-in" on a system fault. That's really the test! With Allis-Chalmers mechanism, air or oil pressure need not be dumped to permit opening. Trip coil releases a latch and the simple closing linkages uncouple, allowing contacts to open at full speed — regardless of the position or condition of the closing mechanism. That's fully mechanically trip-free operation!

Non-mechanically trip-free mechanisms require dumping of air or oil pressure so that contacts can open. To do this takes a whole sequence of devices, including valves and solenoids. Everything must work perfectly, or breaker will be held closed or slowed in opening.

This truly simple operator principle has been a feature of Allis-Chalmers breakers since 1933. For further details call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4219

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

Now! Complete Flexibility

THE NEW, IMPROVED *Wheeler* DURATACH LINE

Complete Interchangeability

New design permits use of any Duratach Reflector with any Duratach Canopy Assembly, thus easily adaptable to any installation.

3 methods of hanging

to meet all lighting requirements . . . basic PENDANT installation, with simple conversions to SIDE OUTLET and OUTLET BOX.

5 Reflectors

each designed to do a specific lighting job

RLM Standard Bowl

RLM 30° Angle RLM Deep Bowl

Shallow Dome Elliptical Angle

Wheeler REFLECTOR COMPANY
275 Congress Street, Boston 10, Mass.
Distributed Exclusively through Electrical Wholesalers

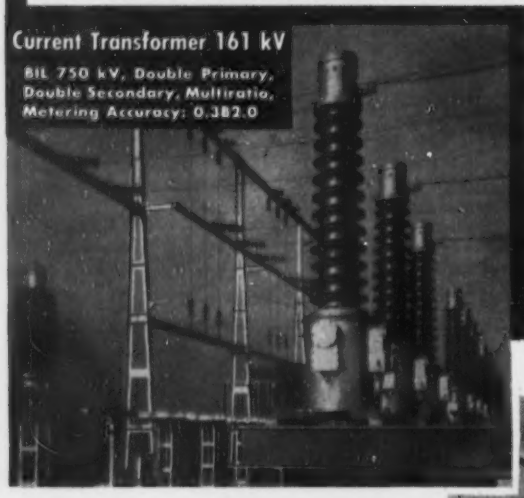
For complete information write for New
DURATACH BULLETIN

BROWN BOVERI

High Voltage, Insulation-type, Oil-filled

INSTRUMENT TRANSFORMERS

conform to prevailing ASA standards C57.13

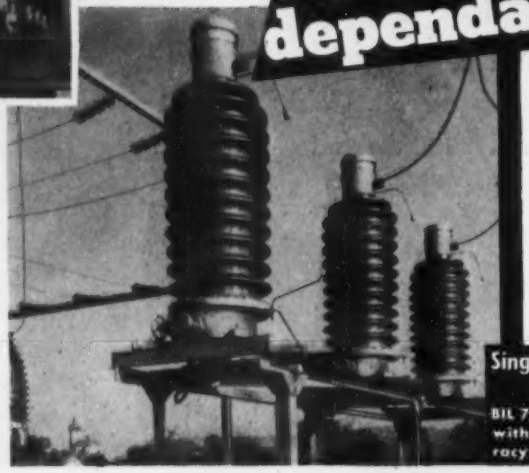


Current Transformer 161 kV
BIL 750 kV, Double Primary, Double Secondary, Multiratio, Metering Accuracy: 0.3B2.0

low cost

low weight

...and brown boveri dependability



Single-Phase Potential Transformer 161 kV
BIL 750 kV, Ratio 1400/800:1 with tertiary winding, Accuracy: 0.3 WXYZ

CHECK ALL THESE ADVANTAGES:

1. Priced for economy-minded, quality-conscious purchasers. Low cost is made possible by mass production of insulator type transformers used with the advanced-design Brown Boveri Air Blast Breakers.
2. Newly designed for extreme light weight and small size.
3. No erection costs at the job site. They are shipped from the factory completely assembled, filled with oil, tested, ready for installation.
4. Designed for minimum maintenance.
5. No extra charges for non-preferred ASA primary current ratings of current transformers.
6. No extra charges for tertiary winding of potential transformers.
7. Backed by the world-famous engineering and production background of Brown Boveri.

SUITABLE for both revenue METERING and RELAYING, these Brown Boveri instrument transformers are available for outdoor service in all standard ASA voltage classes: 34.5 kV to 345 kV and higher.

The remarkably low prices of these current and potential transformers — particularly those at higher voltages, invite comparison by astute users. They discover that they can make substantial dollar savings while securing thoroughly dependable, proven-in-the-field reliability when they specify Brown Boveri. *Write for data.*

BROWN BOVERI

buy brown boveri . . . *it's better business!*

BROWN BOVERI CORPORATION

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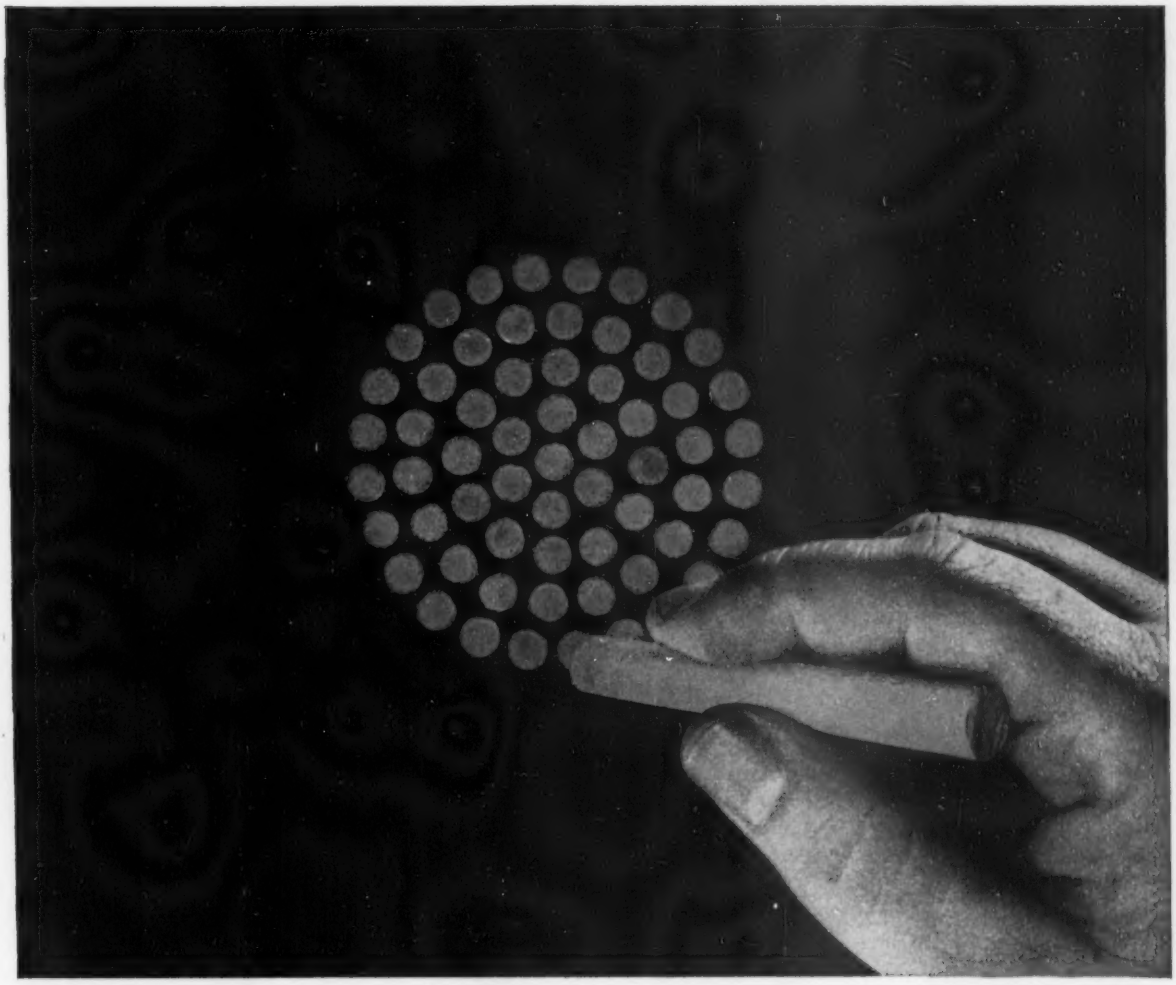


THE ADVANTAGES OF

CABLE TYPE

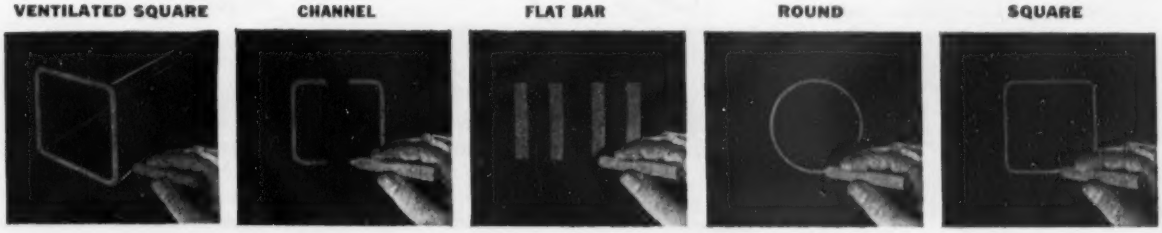
BUS CONDUCTORS

Cable and Strand are efficient bus conductors in electric power switching structures wherever clearances permit and spans are too long for rigid types. They are the preferred flexible conductor for delivering heavy currents, generally at the lower voltages, to electric furnaces or to any concentrated industrial electrical load.

Proper stranding of the conductor wires is necessary to obtain flexibility, strength and the smallest *practical* voltage drop.

There is a complete line of ANACONDA Copper Bus Conductor designs for every type of installation and power requirement. Write today for your copy of "ANACONDA Copper Bus Conductors" containing illustrations and detailed technical information concerning designs and arrangements for bus conductors. *The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.* 53130 Rev.

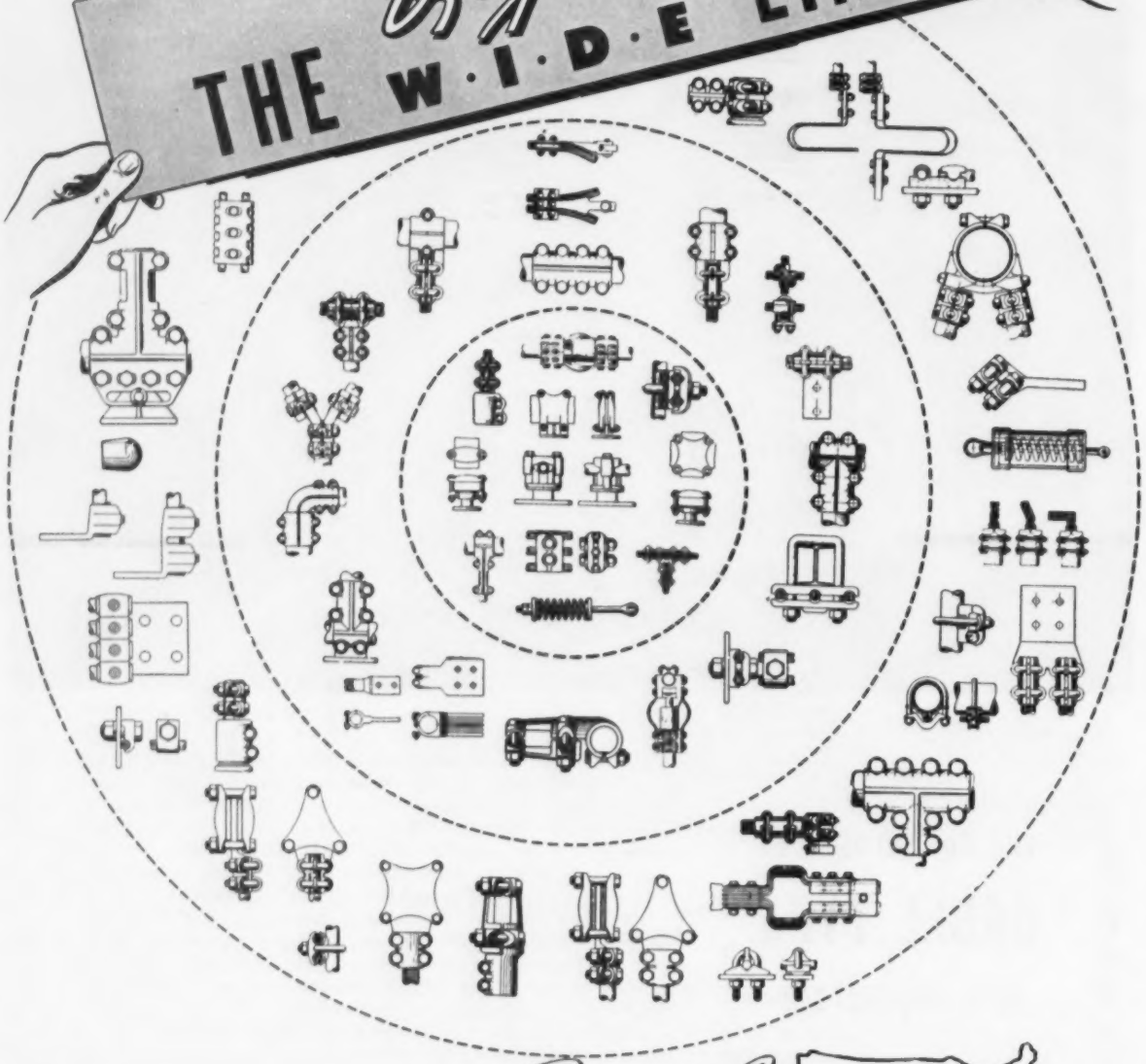
carry the load with ANACONDA® Bus Conductors



when you need . . . .

POWER CONNECTORS • GROUND CLAMPS AND EQUIPMENT TERMINALS *be sure to check*

Royal THE W·I·D·E LINE



Royal Power Connectors are manufactured from high-conductivity, high strength copper alloy. Multiplicity of point contacts develop the lowest resistance and highest pull-out strength. ½-inch Silicon Bronze hex head bolts are standard for conductor sizes from ½" IPS and larger, and 500 MCM and larger. Nested bolt heads permit "one wrench" installation. Let us quote on *your requirements.*

Royal

A Part of the Arsenal of AMERICAN POWER PRODUCTION

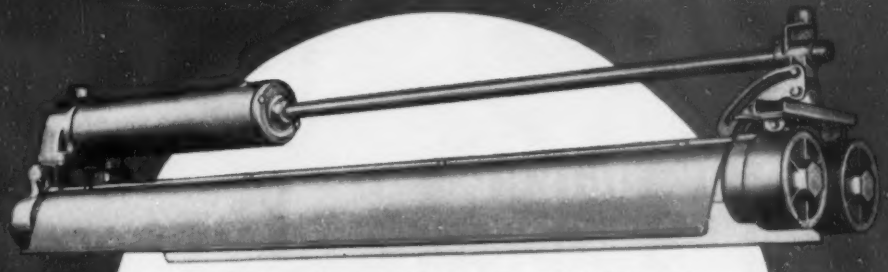
ROYAL ELECTRIC MANUFACTURING COMPANY

INCORPORATED

1122 EAST 87th STREET Chicago 19, Ill.

Designers and Manufacturers of Power Switching Equipment and Special Electrical Devices

CROUSE-HINDS High Efficiency LIGHTING EQUIPMENT...



Type EVF Explosion-Proof and Dust-Tight Fluorescent Lighting Fixtures
Slimline and Bi-Pin 1, 2, 3, or 4-Lamp

EV Series Explosion-Proof and Raintight Lighting Fixtures

. . . for Hazardous Locations

Crouse-Hinds explosion-proof lighting fixtures exceed the requirements for service in highly explosive atmospheres. They are designed to operate at a temperature below the ignition temperature of the gas-air or vapor-air mixture. They are so strong that they will resist internal explosions without damage and so tight that they will prevent the escape of flames or burning gases which might ignite the surrounding atmosphere.

Crouse-Hinds dust-tight lighting fixtures assure safety in locations that are hazardous because of the presence of combustible dust.

DL Series Dust-Tight and Raintight Lighting Fixtures

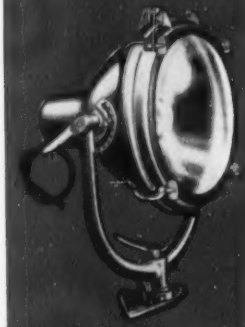
Type MDB-14 Floodlight

. . . for Wet and Corrosive Locations

Crouse-Hinds vaportight lighting fixtures are ideal for use in boiler rooms, powerhouses, shower rooms, tunnels, loading docks, building entrances, and all indoor and outdoor locations where exposed to moisture and rain, noh-explosive vapors and gases, or non-combustible dusts.

Hundreds of industrial lighting fixtures are listed in Crouse-Hinds Condulet Catalog.

V Series Vaportight and Raintight Lighting Fixtures



Type ADE-14 Heavy Duty Floodlight

. . . for Protection

Sabotage thrives in darkness. The most reliable and cheapest form of protection against night prowlers is LIGHT! Crouse-Hinds floodlights project powerful beams of light that bathe all approaches to your property with glaring radiance, killing darkness and shadows and compelling everyone to be more visible at night than in broad daylight.

The protective power of light should be used in all important municipal and industrial locations. The floodlighting of industrial plants serves a double purpose. It helps to boost production in addition to the security it provides.

Send for your copy of Bulletin 2565, "LIGHT! Protect Your Property."

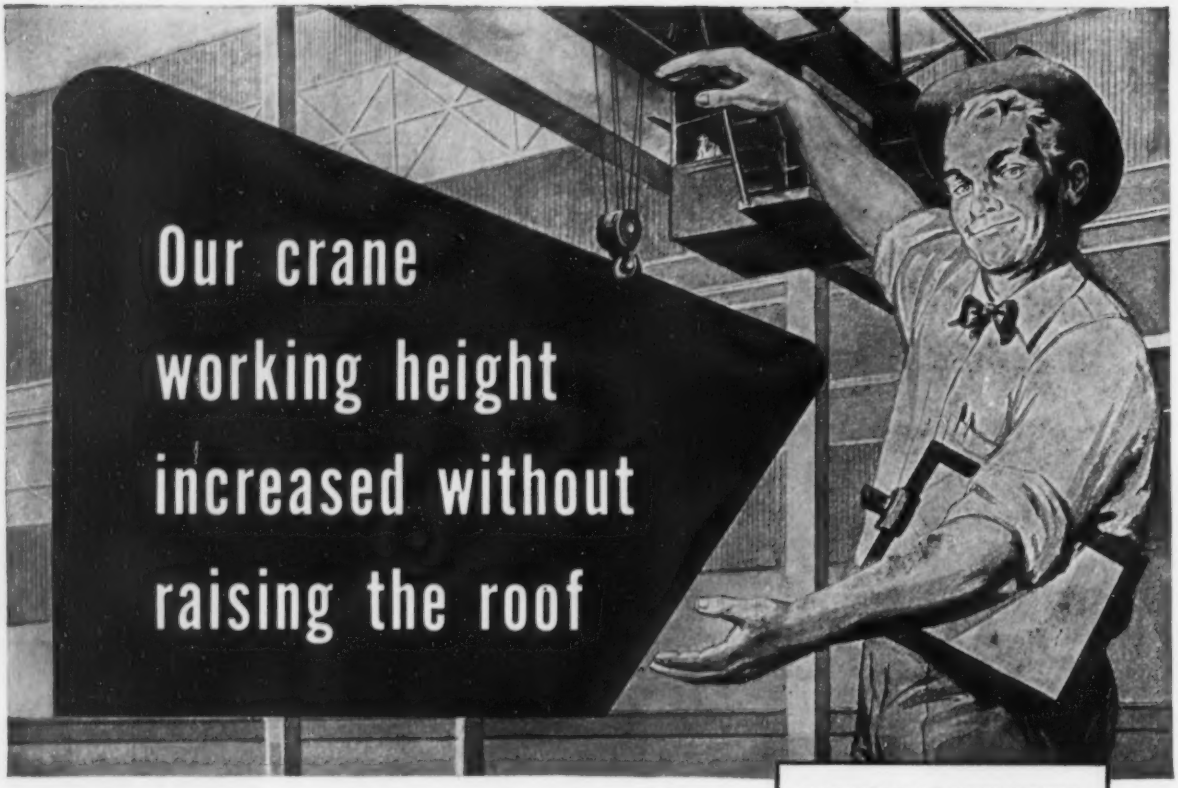
Type DCX Searchlight

A Nationwide Distribution Through Electrical Wholesalers

CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

OFFICES Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver Detroit — Houston — Indianapolis — Kansas City — Los Angles — Milwaukee — Minneapolis New Orleans — New York — Philadelphia — Pittsburgh — Portland, Ore — San Francisco — Seattle St. Louis — Tulsa — Washington. RESIDENT REPRESENTATIVES Albany — Atlanta Baltimore — Charlotte — Corpus Christi — Richmond, Va. — Shreveport
Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

FLOODLIGHTS · AIRPORT LIGHTING · TRAFFIC SIGNALS CONDULETS



WITH EC&M YOUNGSTOWN SAFETY LIMIT STOPS

"We frequently needed more headroom on our D-c cranes. The limit stop setting couldn't be raised without sacrificing the clearance needed by the hoist-brake to safely stop the fast-moving empty hook, which hoists 2½ to 3 times faster than when hoisting full load. We had a choice . . . we could raise the roof . . . which meant deeper footings, heavier building columns and increased costs for lighting, heating and ventilating . . . OR . . . we could equip our cranes with **quick-stopping** EC&M Youngstown Safety Limit Stops."

Yes, Youngstown Hoist Limit Stops not only disconnect power from the motor but also apply **dynamic braking** to aid the hoist-brake in a **quick stop** . . . giving less drift . . . more headroom. **Safe,** too, because the tripping point does not change . . . is not affected by stretching of the hoist cables. The point at which the rising crane-hook makes contact to lift the Youngstown suspended-weight always remains the same.

For increased D-c crane headroom, **plus safety,** investigate EC&M Youngstown Safety Limit Stops.

QUICK-STOPPING type of LIMIT STOP gives MINIMUM DRIFT
CIRCUIT-OPENING type of LIMIT SWITCH requires GREATER CLEARANCE FOR DRIFT
THIS SPACE SAVED

Write today for Bulletin 1032 which describes and illustrates EC&M Youngstown Limit Stops.

YOU CAN LIFT LOADS ***HIGHER*** *AND* ***SAFER*** *WITH* ***EC&M*** *YOUNGSTOWN SAFETY LIMIT STOPS*

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

KEEP YOUR POWER LOAD UP ...YOUR OUTAGES DOWN!

String Copperweld TRADE MARK

OVERHEAD GROUND WIRES

—and get PERMANENT PROTECTION for your Transmission Lines

Every year an average of 70,000 strokes of lightning hit power lines in this country, causing 10 times as many transmission outages as any other single factor. As a practical, economical solution to this serious problem, many power systems are using Copperweld* Overhead Ground Wires on their transmission lines to be sure of safe, low-cost and permanent protection against lightning damage.

Copperweld's thick copper covering, inseparably molten welded to the strong steel core of each wire, affords excellent electrical conductivity for relaying and for dissipating lightning discharges. And because this copper covering is rust resistant, the high strength of each wire remains permanent. Thus, with Copperweld Overhead Ground Wires, you can string with small sags to maintain ample mid-span clearances—even under the most severe weather conditions.

Plan now to shield your transmission lines with Copperweld Overhead Ground Wires. You'll find there's no better way to reduce lightning losses, keep upkeep down and be assured of constant uninterrupted service. Write today for your copy of the Copperweld Engineering Data Book—there's no obligation.

*Trade Mark

COPPERWELD STEEL COMPANY • Glassport, Pa.

SALES OFFICES IN PRINCIPAL CITIES

Copperweld TRADE MARK

NON-RUSTING

OVERHEAD GROUND WIRES

Last The Life Of The Conductors They Protect!

LESS LABOR KILLS more brush at lower costs when you use "Ammate." It kills more kinds of brush than most weed and brush killers and keeps brush down longer!

AFTER THREE YEARS—Here's the same right-of-way as shown at left. Brush still remains under control, yet low-growing natural cover returned to resist erosion.

How to keep brush down for years!

Industrial users of "Ammate" Weed and Brush Killer say that when the original spray job is done well, brush is kept under control with nothing more than an occasional spot spray years later.

This year, be sure to include "Ammate" in your brush-control program. It's ideal on power, telephone pipe-lines and railroad right-of-ways—wherever you have a brush problem.

Free illustrated booklet *describes how to control brush in right-of-ways with Du Pont "Ammate." For your copy, write Du Pont, Grasselli Chemicals Department, D-4026, Wilmington, Delaware.*

DU PONT
REG. U. S. PAT. OFF.

Ammate®

Weed and Brush Killer

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

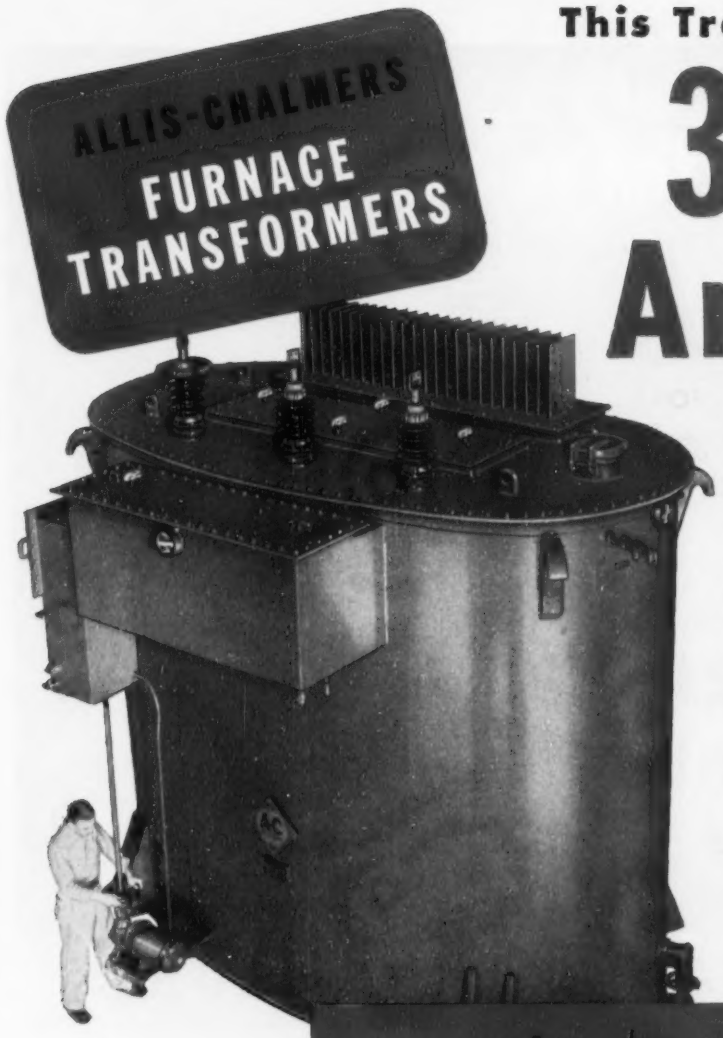
On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

EVEN WHERE right-of-ways adjoin sensitive crops, like cotton, you can rely on "Ammate" to do the job safely. That's because it's not volatile—reducing spray-drift damage to a minimum.

MAINTENANCE CREWS and custom sprayers prefer "Ammate" for faster, safer, longer-lasting control of brush. And they can use it without hazard to themselves, livestock or wildlife. "Ammate" is non-flammable, too.

This Transformer Delivers

33,962 Amperes

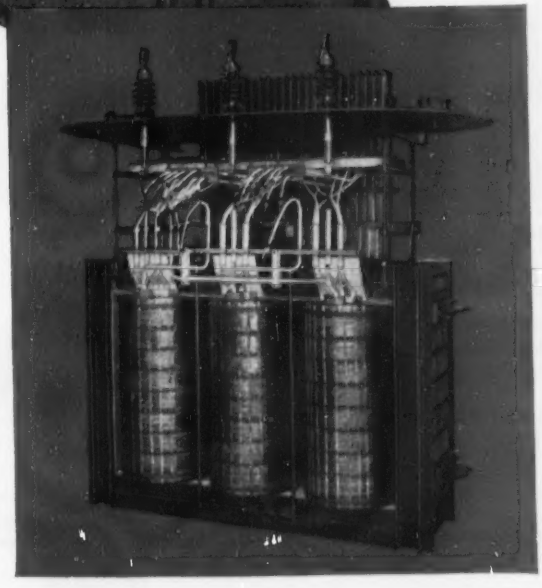


Providing high continuous current for specialized steel processing is an everyday duty for this transformer. Its well-balanced design and sturdy construction is based on past records of Allis-Chalmers transformers which show ability to withstand as much as 25 to 30 years of the repeated daily short circuits encountered in furnace operation. Allis-Chalmers has been building arc furnace transformers for over 45 years.

In addition to furnace transformers in any rating up to the largest demanded by the industry, Allis-Chalmers builds a complete line of arc furnace electrical equipment, including electrical control, circuit breakers, and auxiliary transformers.

Next time you consider a new or replacement arc furnace transformer, consult the Allis-Chalmers district office nearest you or write Allis-Chalmers, Milwaukee 1, Wis.

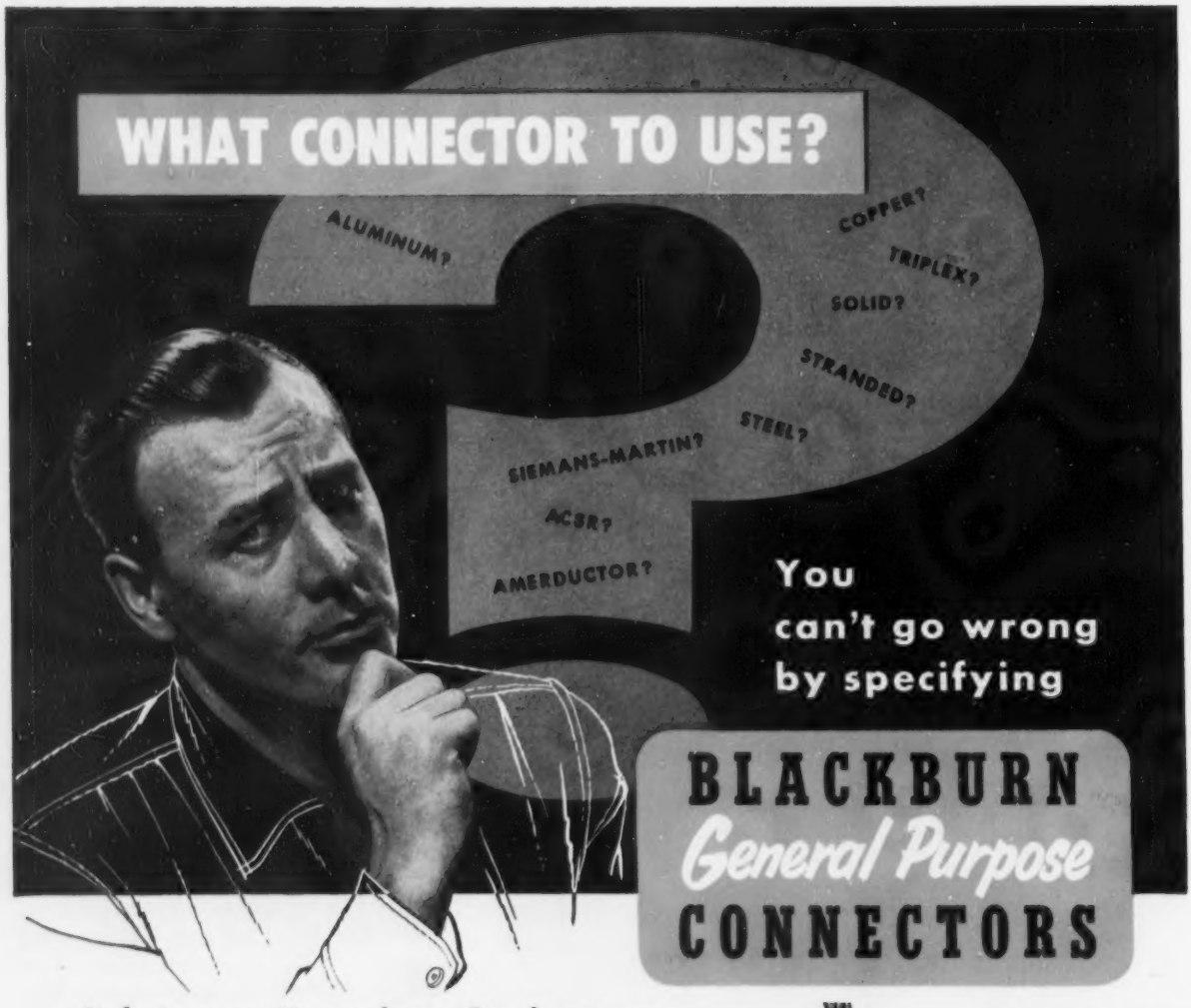
A-4318



One of three 20,000-kva arc furnace transformers recently built by Allis-Chalmers for a large eastern steel manufacturer. Each can deliver a continuous current of 33,962 amperes per phase. Picture at right shows core and coil assembly.

- Extremely heavy supports brace coils against severe short circuit stresses.
- Skilful insulation techniques protect windings from overvoltages due to wide tap range. Some units are designed for as much as 50% range in secondary voltages.
- Tap-changing mechanism, specially designed for furnace transformers, is in separate compartment to facilitate periodic inspection and maintenance. Wide, flat contacts provide the long life needed for numerous daily tap-changing operations. Mechanism can be either motor driven or manually operated.
- Grit blasting and three coats of baked-on alkyd resinous paint give transformer good surface protection against industrial corrosion.

ALLIS-CHALMERS



Safe to use - Hazardous, Cumbersome Tools not required for installation

Many times each day engineers and operating men are faced with these questions: "What connector shall I use to meet these varied conductor requirements?"—"What connector is safe and easy for linemen to install, yet insures a long lasting connection under different conductor conditions?"

The best answer, as many linemen have found, is BLACKBURN General Purpose CONNECTORS because they:

- **are made of corrosion resistant alloys, heavily tin plated.**
- **are time tested in field operation under all weather conditions.**
- **are available in various designs as illustrated.**

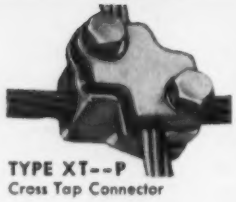
On all your connection installations use BLACKBURN'S contact paste: *Contax*

Increase conductivity and protect your connection. Metallic particles in this paste break through oxide films, lower interstrand and joint resistance; low resistance connections remain cooler, last longer.

Available through electrical wholesalers everywhere

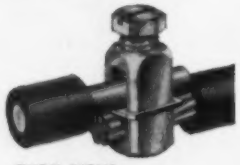
JASPER BLACKBURN CORPORATION

35 Madison Street — St. Louis 6, Mo. — Phone MAin 1-2821

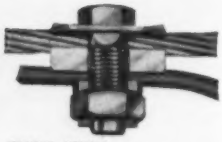


TYPE XT--P
Cross Tap Connector

TYPE PC 250-P
Parallel Groove Clamp



TYPE NPW
Service Entrance Connector

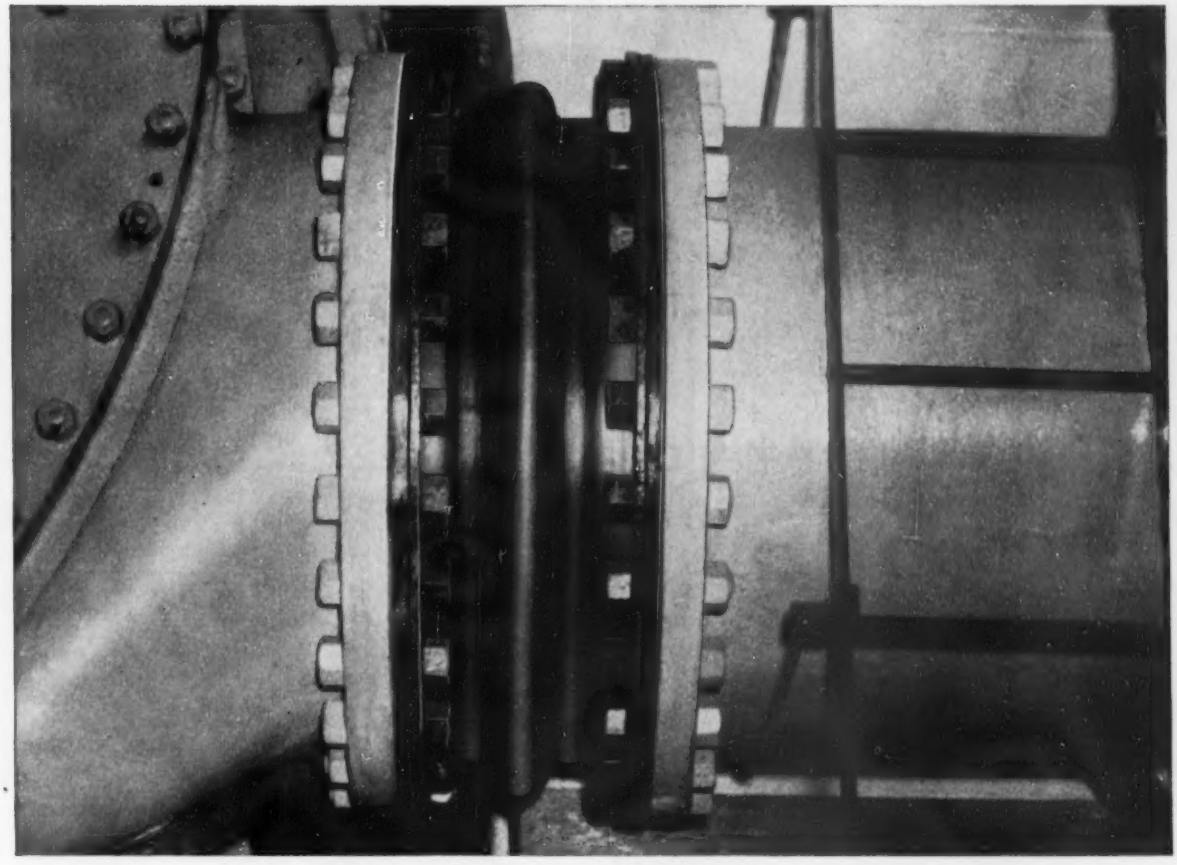


TYPE HPW
Split-Bolt Connector

TYPE PC2-P
Parallel Groove Clamp

TYPE 2B-PW
Two Bolt Clamp

28 years old... but there's a lot of life in the old joint!



Back in 1926, this 30" x 12" U.S. Expansion Joint was installed in a Louisiana power plant. This rubber joint is still in fine working condition. Age has not impaired its efficiency. Three other U.S. Joints in this plant are the same age, are still performing well... and one of them has been used continuously in the valve end inlet header water circulation line in a *very moist location.* Our service engineers report it has many more years of fine service still ahead!

In United States Rubber Company's Expansion Joint Line are standard types to meet the majority of general industrial requirements on pressure or vacuum lines—insulating against vibration, compensating for expansion or contraction. Joints can also be designed and built to meet your own specifications. You can always rely on U.S. Expansion Joints to lengthen the life of equipment, save many times their original cost.

Get in touch with any of United States Rubber Company's 25 strategically located District Sales Offices, each staffed with engineers to serve you, or write to address below.

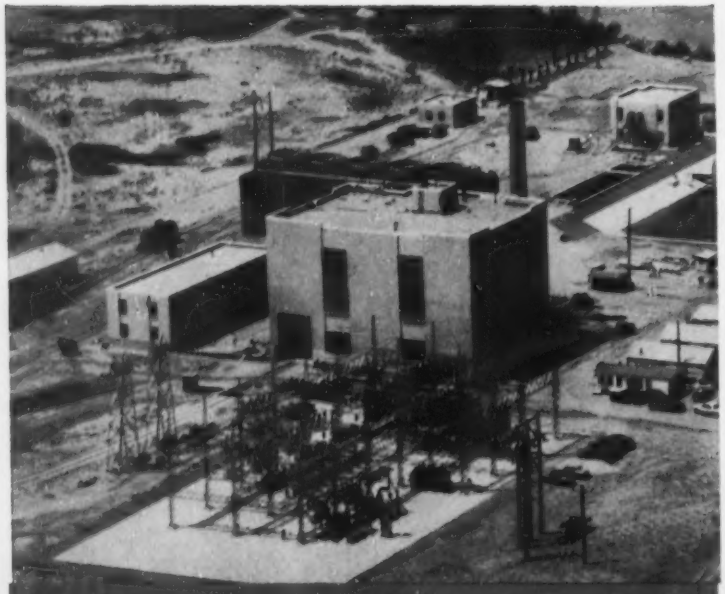
U.S. RUBBER
SERVING THROUGH SCIENCE

"U.S." Research perfects it
"U.S." Production builds it
U.S. Industry depends on it

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes
Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting



The Laredo Steam Plant located on the Rio Grande. Across the river is Old Mexico.

POWER TO SPARE...

Laredo Power Station of Central Power & Light Co.

Exide-Manchex

BATTERIES

Laredo's bank of 60 EME-25 Exide-Manchex batteries.

Contributing to the industrial, commercial and agricultural development of South Texas is the new Laredo power station. It's another forward step for Central Power and Light Company, whose policy is to locate its power plants at the load centers and to maintain a well-balanced system throughout South Texas. The big generating unit can produce 33,000 kilowatts, or enough electrical power to serve a city 3 times the size of Laredo. Switchgear at the Laredo plant is operated by a bank of 60 EME-25 Exide-Manchex batteries.

Exide-Manchex batteries are reliable; they assure:

POSITIVE OPERATION: Dependable performance at ample voltage avoids switchgear operational failures.

INSTANTANEOUS POWER: High rates for switchgear and valve operation with adequate reserve power for all other control circuits and for emergency lighting.

LOW OPERATING COST: Extremely low internal resistance.

LOW MAINTENANCE COSTS: Water required about twice a year. No change of chemical solution during life of battery.

LOW DEPRECIATION: Sturdy, long-life construction.

GREATER CAPACITY in a given amount of space avoids overcrowding.

• • •

Various sizes and types of Exide Batteries are available in plastic containers.

Exide-Manchex is your best battery buy for all control and substation services.

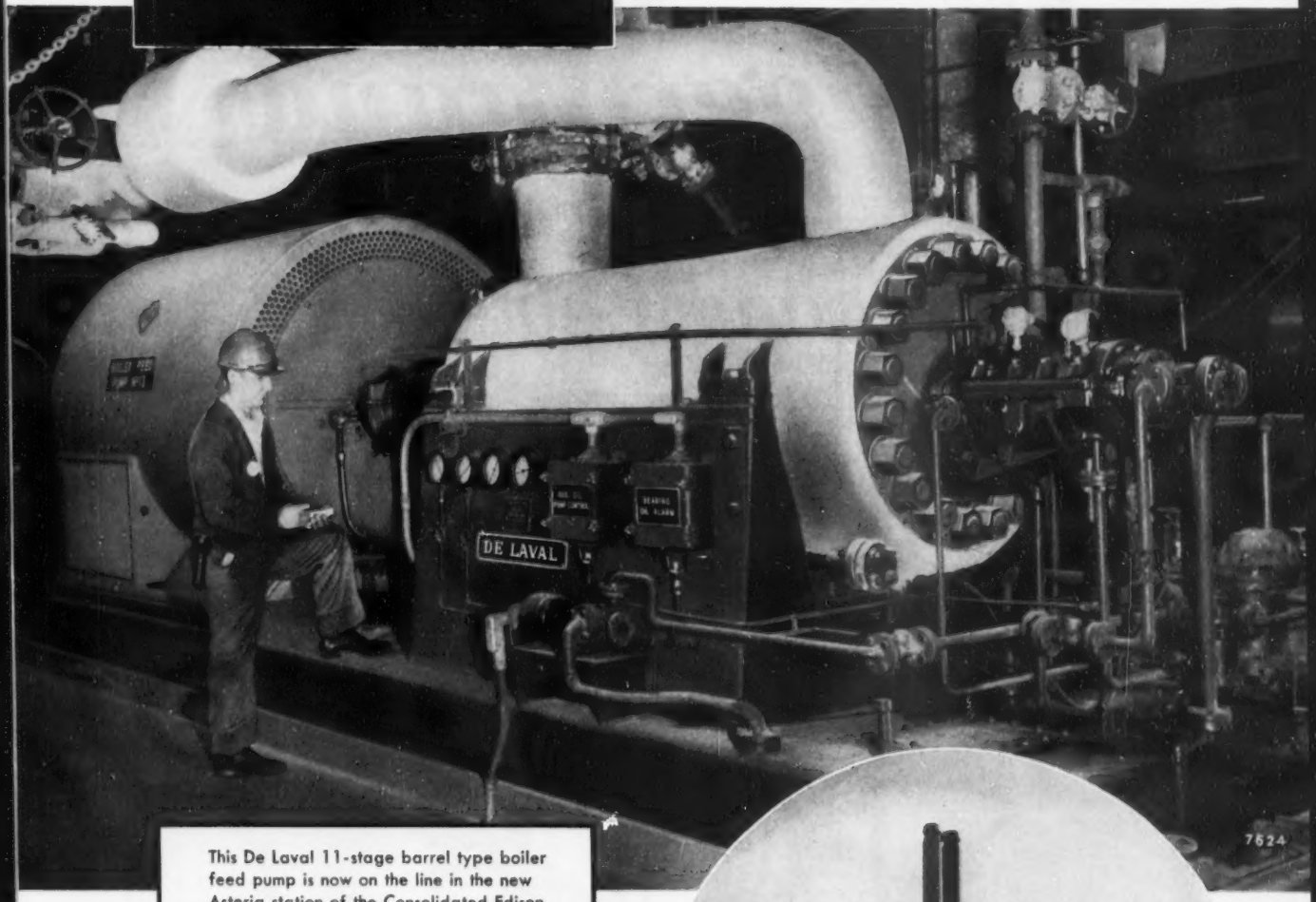
Exide INDUSTRIAL DIVISION
The Electric Storage Battery Company,
Philadelphia 2
Exide Batteries of Canada, Limited, Toronto

"EXIDE" and "MANCHEX" *Reg. T.M. U.S. Pat. Off.*

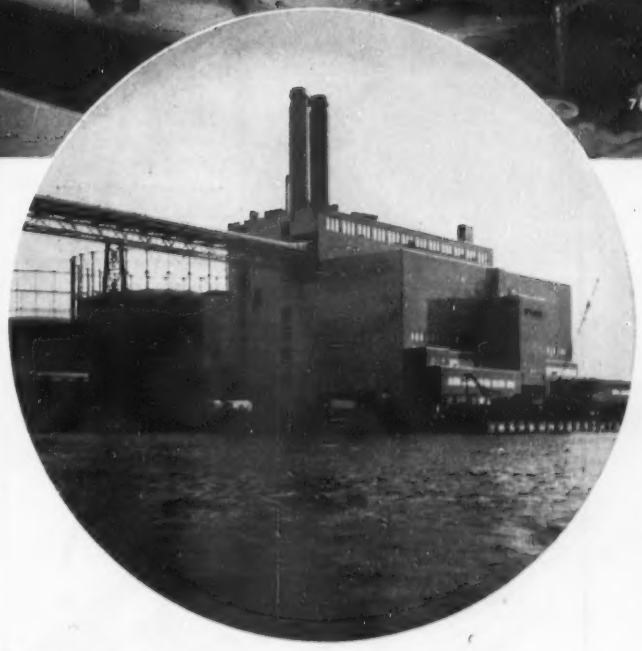
1888
DEPENDABLE BATTERIES FOR 66 YEARS
1954

DE LAVAL
BARREL TYPE BOILER FEED PUMP

in new Con Edison *Astoria power station*



This De Laval 11-stage barrel type boiler feed pump is now on the line in the new Astoria station of the Consolidated Edison Co. of New York.



The De Laval 8/6 pump operates at 129 psig suction pressure and delivers 1,570 gpm of 344 F water against 2,229 discharge pressure. Direct-connected at the end of the boiler feed pump shaft is a De Laval IMO pump for lubrication of the main pump and motor bearings. Also furnished is a motor-driven De Laval IMO auxiliary oil pump with pressure controlled switches. De Laval barrel type boiler feed pumps meet all the requirements of high pressure, high temperature boiler feed service. The distinctive De Laval design assures years of reliable operation with minimum maintenance.

DE LAVAL *Boiler Feed Pumps*

DE LAVAL STEAM TURBINE COMPANY

861 Nottingham Way, Trenton 2, New Jersey

You just can't miss with

Tiger Brand

Electrical Wire and Cable

Varnished Cambric

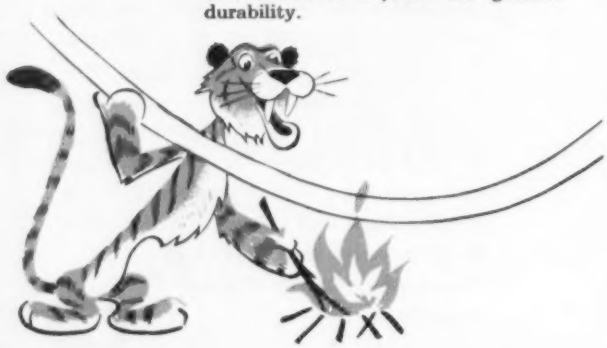
Tiger Brand Varnished Cambric Cable is the most economical way to transmit large blocks of power short distances.

Amerclad

To withstand physical abuse, moisture, sun and oil, use Tiger Brand Amerclad for all sorts of portable equipment.

Amerbestos

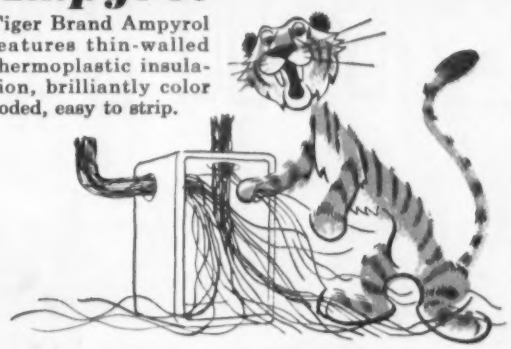
Tiger Brand Amerbestos is a true *quality* heat resistant material. The asbestos is *felted* for greater durability.



Submarine For underwater power distribution, there's a Tiger Brand Submarine Cable to withstand any operating condition.

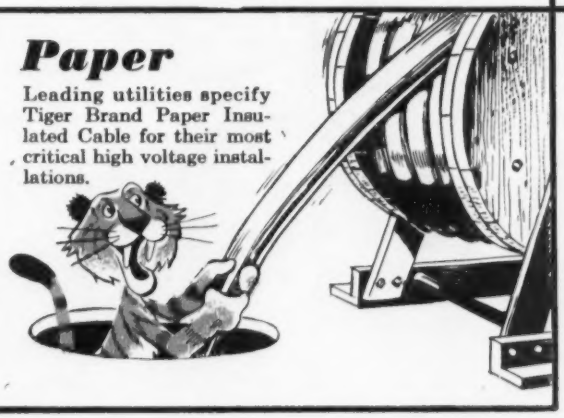
Ampyrol

Tiger Brand Ampyrol features thin-walled thermoplastic insulation, brilliantly color coded, easy to strip.



Paper

Leading utilities specify Tiger Brand Paper Insulated Cable for their most critical high voltage installations.



American Steel & Wire *specializes* in wire and cable that must withstand abusive service. No matter what kind of operating condition you may have, there is probably a *standard* Tiger Brand Wire or Cable that will give you better service than you ever dreamed of.

Send the coupon and outline your problem. We'll see that you get service—*fast.*

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- asbestos wire and cable
- mold cured portable cord
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● Please give me more information about Tiger Brand Wire & Cable for .....

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Address .....
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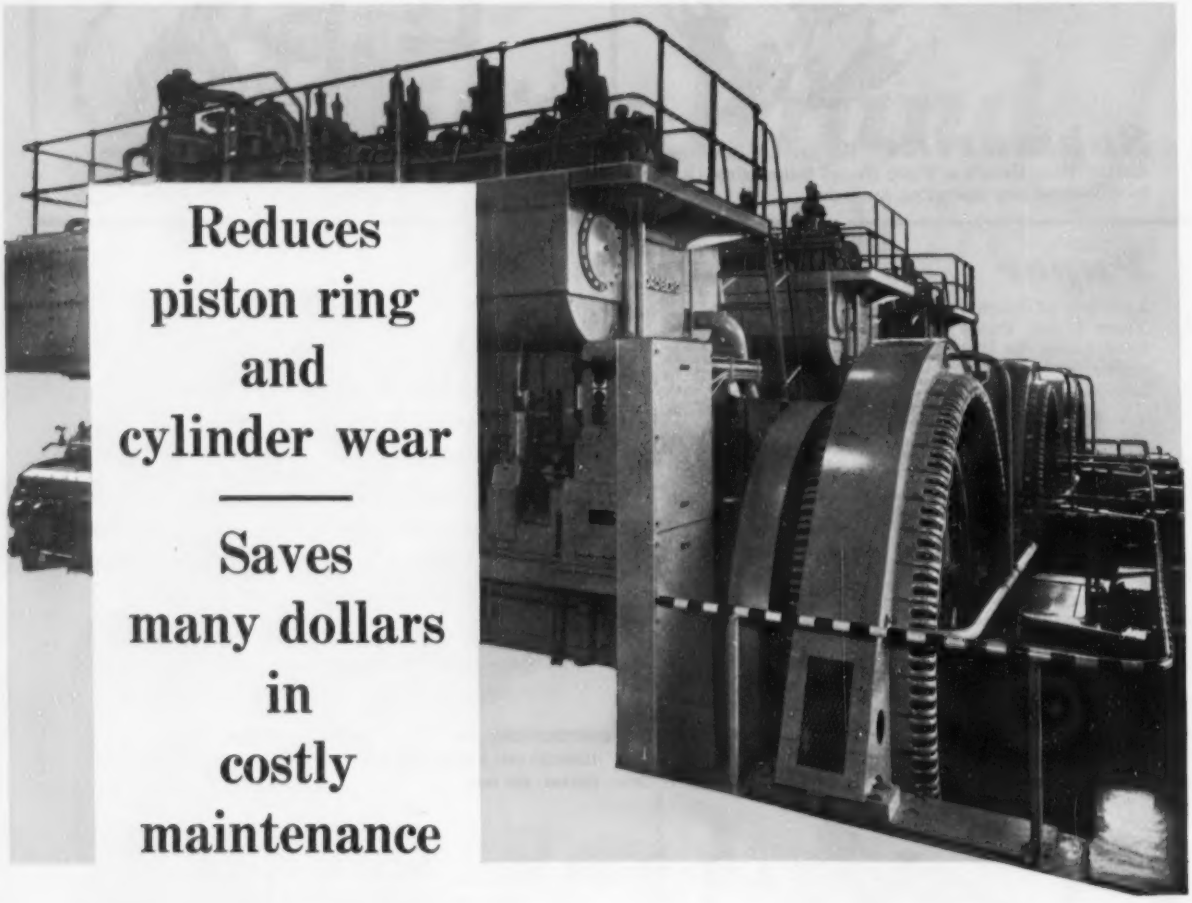
U·S·S Tiger Brand ELECTRICAL WIRE & CABLE

USS

UNITED STATES STEEL

Shell Rotella Oil



Reduces piston ring and cylinder wear

Saves many dollars in costly maintenance

These dual-fuel engines in the Municipal Power Plant at Houma, Louisiana, supply dependable, low-cost electric power to the entire city. Shell Rotella Oil is the cylinder lubricant.

Here's just one of the many diesel power plants that depend on SHELL ROTELLA OIL for reduced wear of engine parts . . . lower maintenance cost.

The anti-corrosive action in Shell Rotella Oil combats the major cause of engine wear . . . cylinder and piston ring wear caused by acid action from the by-products of incomplete combustion and condensation.

Tougher lubricating film in Shell Rotella Oil gives cylinders and rings greater protection . . . minimizes wear. Its effective detergent-dispersant action prevents harmful deposits.

Write for technical information. See for yourself how Shell Rotella Oil can help reduce your engine maintenance costs.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
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SHELL

EXTRA! EXTRA! EXTRA!

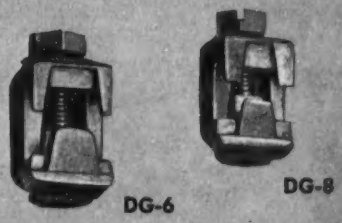
ANDERSON

HIGH-STRENGTH BRONZE ALLOY

Dura GRIP

CONNECTORS

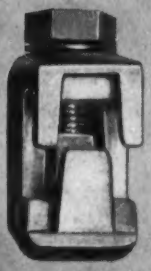
8 SIZES FROM #8 STRANDED COPPER THROUGH #4/0 STRANDED COPPER



DG-6 DG-8

DG-4

★ **ABW DESIGN MEANS QUALITY** *Plus* **STRENGTH in the RIGHT PLACES**



DG-2

DG-1

1. **EXTRA** VERSATILITY
   - A: Will install over maximum cables without disassembly.
   - B: Self supporting on line during installation by top or bottom.
   - C: Slotted cap screws in #6 and #8 sizes optional.
   - D: Wider Range.
2. **EXTRA** QUALITY
   - A: High strength bronze alloy in clamping members.
   - B: High tensile silicon bronze bolts.
   - C: Internal spur type lockwashers on all sizes.
3. **EXTRA** HIGH PRESSURE CONTACTS
4. **EXTRA** LONG LIFE*

DG-1/0

DG-2/0

DG-4/0

* Anderson Dura GRIP Connectors will withstand Mercurous Nitrate Specifications ASTM B-154-51 and the more severe ABW 124-2 which insures against seasonal cracking and stress corrosion failures.

FOR MORE COMPLETE INFORMATION, consult your nearest ABW representative or contact our home office.

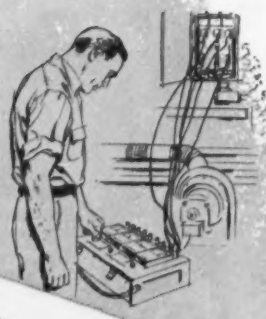
Aluminum & Bronze **POWER CONNECTORS • CLAMPS • FITTINGS • ACCESSORIES for SUBSTATION • TRANSMISSION • DISTRIBUTION SYSTEMS** *for over a Quarter Century*

ABW

ANDERSON BRASS WORKS, INC.

P. O. DRAWER 2151 • BIRMINGHAM 1, ALABAMA

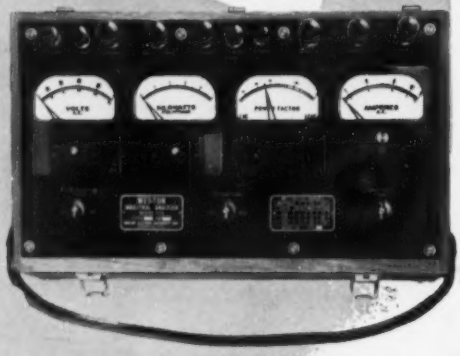
tools that Streamline electrical maintenance



FOR POWER PROBLEMS...

FOR MOTORIZED EQUIPMENT...

FOR ELECTRONIC TROUBLE SHOOTING...



WESTON A-C INDUSTRIAL ANALYZER
(Model 639) a combined Voltmeter, Wattmeter, Power Factor Meter, Ammeter . . . all interconnections made!

A real timesaver because only one hook-up is necessary to measure a-c current, voltage and power in single and polyphase circuits, as well as power factor in 3 phase, 3 wire, balanced circuits. Adequately insulated binding posts . . . high overload capacity. Furnished in compact oak carrying case measuring only 18⅞" x10⅞"x6⅞".

WESTON CLAMP VOLT-AMMETER
(Model 633) measures current and voltage without breaking circuits and disrupting operations.

Combines in one instrument five full-scale a-c current ranges of 1000/250/100/25/10 amperes with range overlap for good readability . . . three self-contained a-c voltage ranges of 700/350/-175 volts, with instrument insulated for 750 volt service. Has convenient 6-position thumb switch for range selection, and adjustable pointer stop for measuring motor starting current.

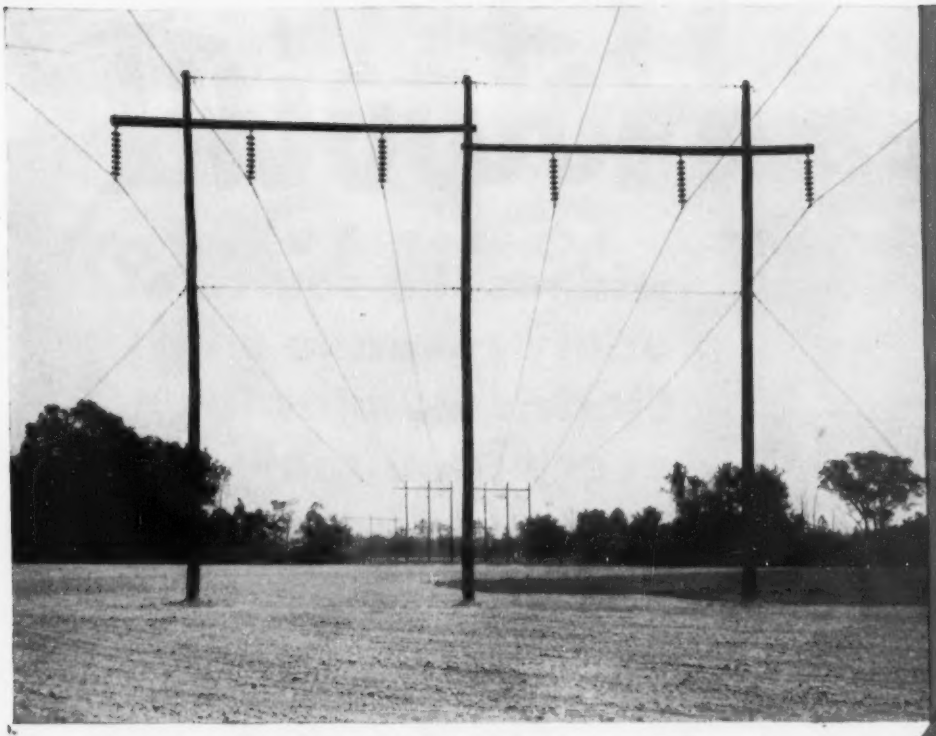
WESTON INDUSTRIAL CIRCUIT TESTER
(Model 785) the versatile 28 range super-sensitive portable tester.

Especially designed for checking electronic control and power equipment. Seven d-c voltage ranges: .1 to 1000 (20,000 ohms per volt) . . . six a-c voltage ranges: 5 to 750 (1000 ohms per volt) . . . six d-c current ranges: 50 microamperes to 10 amperes . . . four a-c current ranges: .5 to 10 amperes . . . five resistance ranges: 3000 ohms to 30 megohms . . . all ranges full scale . . . a-c and d-c current ranges extended with external transformer or shunts. New temperature compensated rectifier circuit gives greater a-c accuracy.

AVAILABLE THROUGH LEADING DISTRIBUTORS

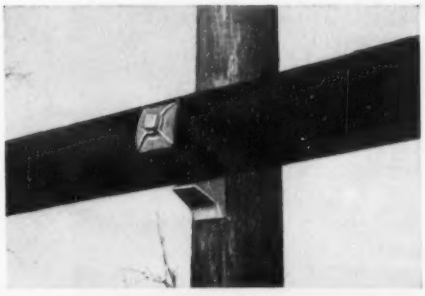
WESTON *Instruments*

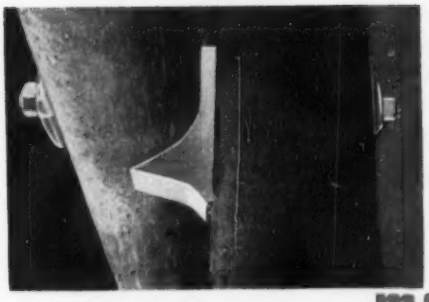
WESTON Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.



M.I.F. GAINS FOR POLE ARMS — SPAR ARMS

Dependable, Economical Pole Arm Installations with M.I.F. GAINS and Single Bolts





- Each M.I.F. Gain secured with one through bolt — reduces number of holes.
- Accommodates wide range of arm diameters — keeps inventory to a minimum.
- Permits through bolt to pass through diametric center of arm — arms can be pre-drilled; no costly spotting and drilling in the field.
- Enables pole arm to contact both vertical and "shelf" surfaces — lower portion of Gain offers "wedge" against vertical movement.
- Provides both *vertical* and *transverse* stability — wide heel pad, large spurs.
- Places through bolt in tension — not in shear.

M.I.F. CURVED WASHERS, available in sizes for all requirements, assure adequate support against both arm and pole.

SPECIFICATIONS

Malleable Iron Castings, Hot Dip Galvanized	PX115	PX116
Size of arms accommodated	6½" to 12½"	9" to 15"
Dimensions of through bolt slot	1 1/16" x 3 1/32"	1 1/16" x 3"
Weight each	5 lbs.	8 lbs.

Provided with tapped hole for bonding connection when specified.

MALLEABLE IRON FITTINGS CO.

Pole Hardware Division — Branford, Connecticut

N. Y. Office: 30 Church St.

Canadian Mfr. & Dist.: LINE & CABLE ACCESSORIES, Ltd. TORONTO

Representatives: William J. Cottrell Co., Portland, Ore. • James H. Drew Corp., Indianapolis, Ind. • Industrial Engr. & Equip. Corp., Los Angeles, Cal. • JBG Electric Co., Chicago, Ill. • B. H. McCoin, Knoxville, Tenn. • E. A. Thornwell, Inc., Atlanta, Georgia • J. P. Voight, Summerville, S. C. • Waltham, DeWitt & Krusi, San Francisco, Calif. • L. G. Wendegats, Kansas City, Mo. • Williams Sales Co., Fort Myers, Fla. • Williamson Sales Co., Shreveport, La. • O. C. Witte Co., Detroit, Mich.

1854 ★ ONE HUNDRED YEARS ★ 1954

Hotpoint

widens the source of utility revenue with Electric Ranges for every requirement

Custom-Sectionalized Range

Super De Luxe 39-Inch Lighted Pushbutton Range

Super-30 De Luxe Lighted Pushbutton Range

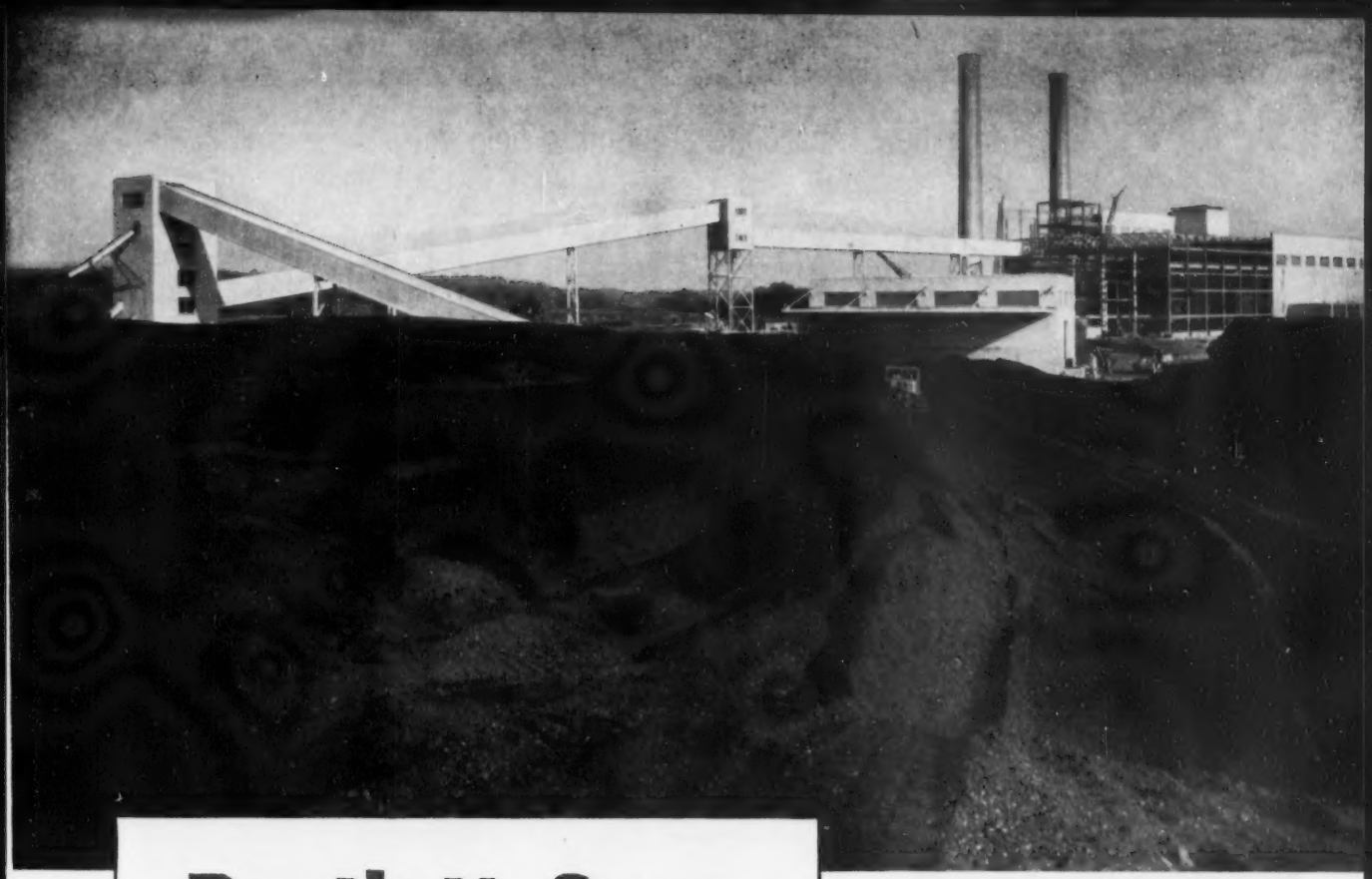
Hotpoint's complete line of 30- and 39-inch ranges, plus a modern custom-sectionalized line means that no matter what special requirement exists, or what range price the lady desires . . . Hotpoint has it.

Two fine new lines have been added to complement Hotpoint's line of highest quality 39-inch ranges. The Super-30 line and the Customline will be welcomed by thousands who will become new customers for electrical energy. The 3 new Super-30's at prices to fit every budget prove that saving space doesn't require sacrificing the wonderful de luxe features of larger Hotpoint models. The Hotpoint Sectionalized Custom Ranges provide an entirely new concept for modern kitchens, combining flexibility of design, efficiency, and economy.

Learn the full story on this Hotpoint Range line from your Hotpoint distributor. See how Hotpoint is opening up new horizons for utility revenue.

Again Hotpoint *looks at Tomorrow, Today*

HOTPOINT Co. *(A Division of General Electric Company)* **5600 West Taylor Street, Chicago 44, Illinois**



General View of O. H. Hutchings Station
Dayton Power and Light Company
Ebasco Services Incorporated
Consulting Engineers

Bartlett-Snow coal handling at Dayton

● The view above shows the first 120,000 KW unit of a plant which will be extended into a 360,000 KW station. The track and reclaiming hoppers, apron feeders, the three 700 ton per hour belt conveyors that total 1,178 feet in length, gates, chutes, and transfer points were detailed and fabricated in our shops and installed by our erectors to Ebasco Services Incorporated's specifications. For maximum efficiency and fixed unit responsibility, let the Bartlett-Snow coal handling engineers work with you on your next job.

Gates and Apron Feeders Under
Track and Reclaiming Hoppers

Drive For 700 Ton Per Hour
Belt Conveyor

DESIGNERS ENGINEERS

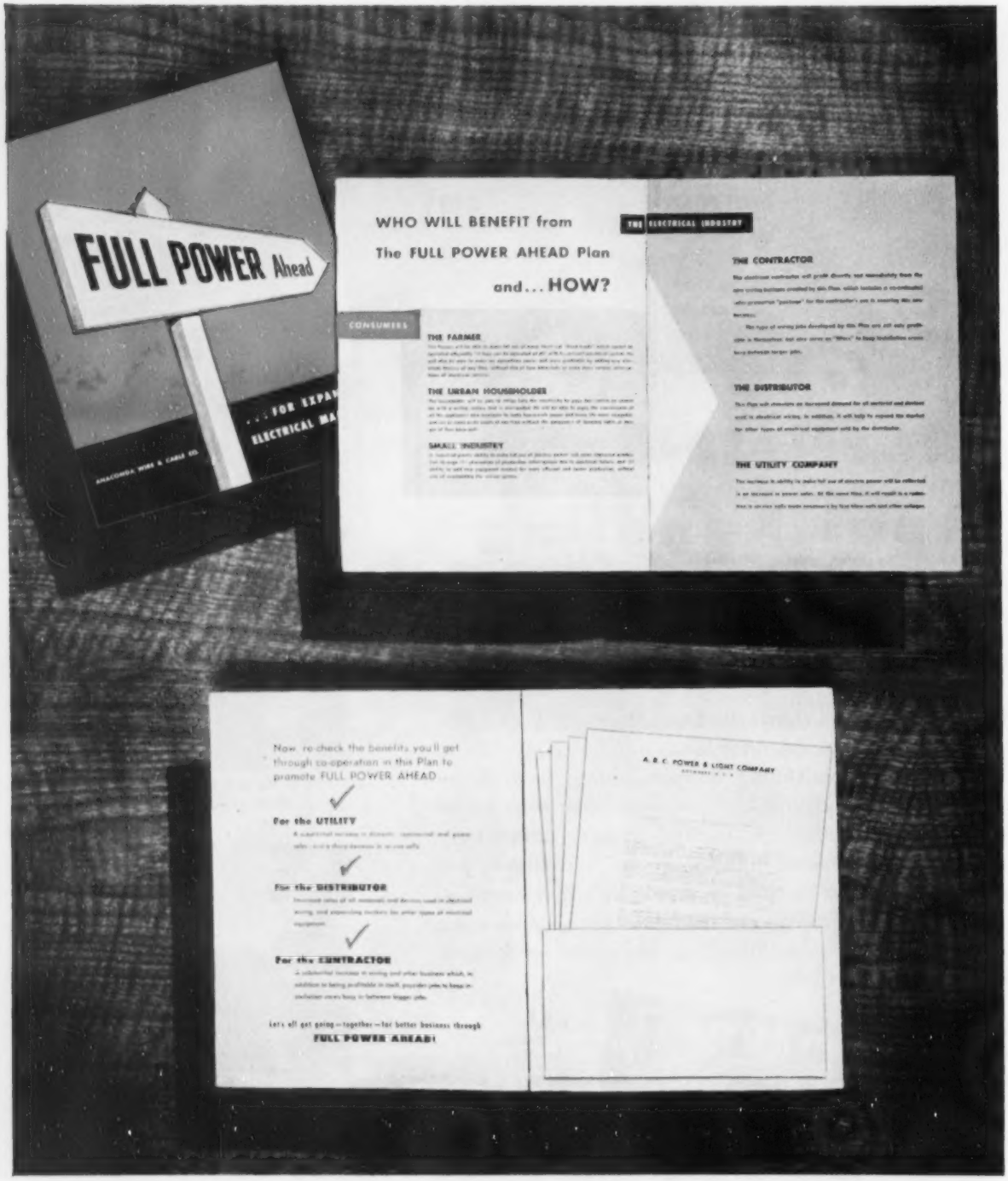
BARTLETT-SNOW
CLEVELAND 5, OHIO

FABRICATORS ERECTORS

"Builders of Equipment for People You Know"

NOW! another new* Anaconda program to help you...

INCREASE


FULL POWER Ahead
ANACONDA WIRE & CABLE CO.
WHO WILL BENEFIT from
The FULL POWER AHEAD Plan
and... HOW?
CONSUMERS
THE FARMER
THE URBAN HOUSEHOLDER
SMALL INDUSTRY
THE ELECTRICAL INDUSTRY
THE CONTRACTOR
THE DISTRIBUTOR
THE UTILITY COMPANY
Now, re-check the benefits you'll get through co-operation in this Plan to promote FULL POWER AHEAD
For the UTILITY
For the DISTRIBUTOR
For the CONTRACTOR
Let's all get going—together—for better business through
FULL POWER AHEAD!
A. B. C. POWER & LIGHT COMPANY

YOUR KWHR SALES *to*

- **HOMES**
- **FARMS**
- **SMALL INDUSTRIALS**
- **COMMERCIAL ENTERPRISES**

"REWIRE NOW!" is theme of new FULL POWER AHEAD Campaign. FREE sales literature is ready to help you promote *full* and more efficient use of electrical power . . . build load.

It's here now! Ready to lend a helping hand to electric power companies who want to encourage greater consumption of power in their territory. Anaconda's new FULL POWER AHEAD Campaign is all set to help you show your customers how to leap over the road block of inadequate wiring. Here's an effective way to educate commercial enterprises, industry, farmers, and homeowners how to make full, *unrestricted* use of electrical power. Logical result is to build profitable load for you . . . and cut down service calls from fuse blowouts and other outages!

FREE sales aids

Samples of suggested letters for mailing to your customers are ready now. Each "beats the drum" for wiring modernization . . . makes your customers more receptive to the efforts of distributors and contractors. These mailings, prepared especially for you, can, of course, be supplemented by any campaign already being sponsored by the cooperating utility.

How to sell the modernization hold-outs

The standard excuse for not rewiring is "can't afford it!" THE FULL POWER AHEAD kit shows how to break through this sales resistance by taking advantage of property improvement loans under FHA Title 1. Just as this has helped others clinch sales, it can help get your customers to rewire now! It's another good reason to get your complete kit.

How to join the FULL POWER AHEAD Campaign

The Anaconda District Sales Office in your area can supply you with all campaign promotional material . . . give you full information about the new FULL POWER AHEAD Plan. Many contractors and distributors have started their mailings. Tie in your promotion with theirs . . . and watch your kwhr sales grow. *Anaconda Wire & Cable Company, 25 Broadway, NewYork 4, NewYork.*

54413

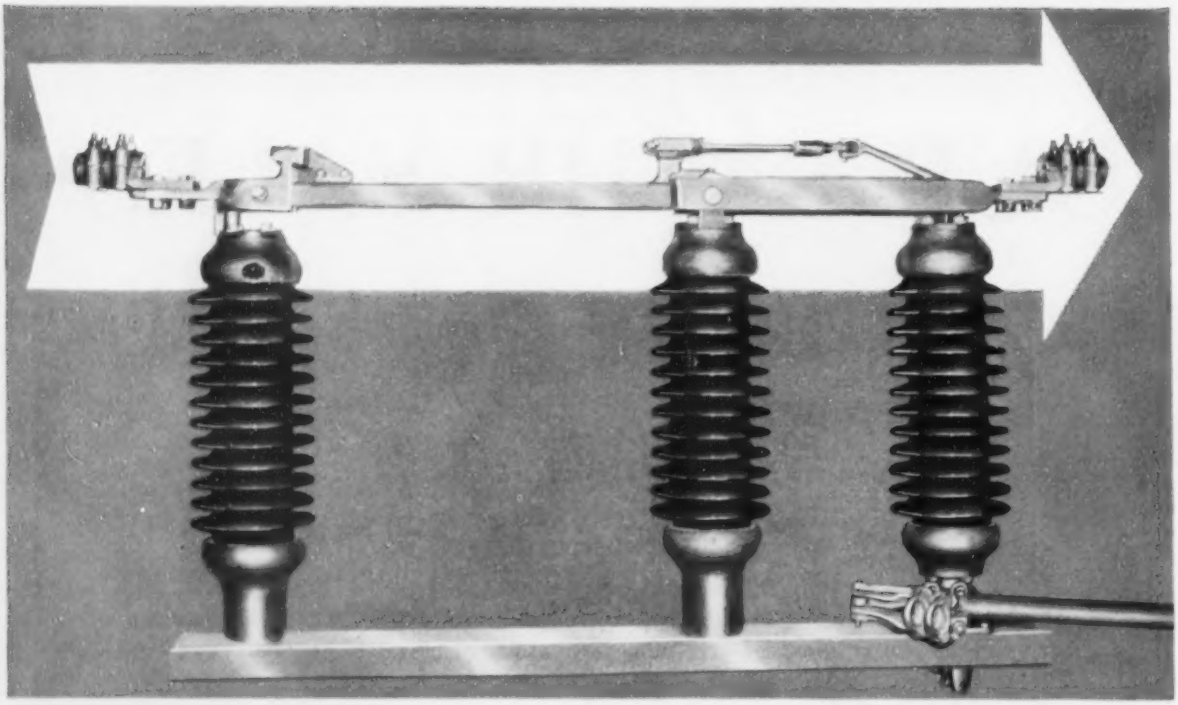
INCREASE SALES OF POWER TO LARGE INDUSTRIALS, TOO!

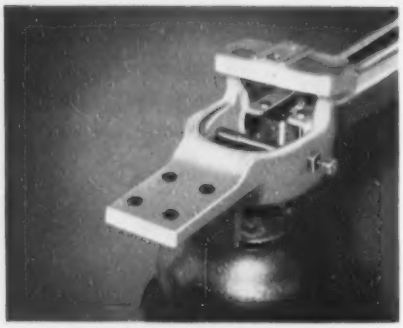
Anaconda has reactivated its successful POWER-UP Campaign. This plan tells industrial plant executives that THERE NEVER WAS A BETTER TIME THAN NOW TO MODERNIZE THEIR PLANT WIRING SYSTEMS. Your Anaconda District Sales Office has the complete story. Investigate today!

ANACONDA®

Primary and secondary distribution cable • building, machine tool, control and communication wire • portable cords and cables • bus-drop cables • apparatus cables • copper, aluminum, copperweld conductors • wire and cable accessories.

***Once again Anaconda takes the lead in industry-wide promotion.** 1936 — Industrial Modernization. 1941 — Preventive Maintenance. 1946 — Wire Ahead. 1950 — Power-Up — And Be Prepared. 1953 — Full Power Ahead.





Front Contact

Hinge Contact

Straight line current path on 3E Airbreak Switch offers major advantages

Cuts down short circuit troubles. Engineers specifying outdoor airbreak switches in the 7.5 KV to 330 KV range will find this 3E design most attractive. Its straight line current path greatly increases ability to withstand "short time" currents.

Design eliminates most of wear on parts. Two important factors insure a long life with a minimum of maintenance . . . there are no braids used on the 8400, and the design of the high pressure contacts eliminates 90% of the friction and strain usually found in high pressure switches. The contacts achieve pressure under spring action. When the switch is closing, a limiting sleeve restrains spring pressure until the switch is approximately 10% from full closure. When the switch is open, this action is reversed. Thus, 90% of the pressure is held in check during opening and closing and there is correspondingly 90% less wear and strain on the silvered contacts and moving parts. With this work load lightened, the 8400 is remarkably easy to operate even when heavily iced.

For complete details write for Bulletin No. 327

3E 8400 AIRBREAK SWITCH

ELECTRICAL ENGINEERS EQUIPMENT CO., Melrose Park, Illinois

LET CADWELD®

SOLVE YOUR GROUNDING PROBLEMS

Pictured are the answers to two common electrical grounding problems solved by CADWELD.

The main illustration shows a permanent CADWELD grounding installation using copper bar in place of cable. The insert shows how the same CADWELD connection was employed where a disconnect type grounding system was required. The disconnect system is specified where periodic resistance checks are taken of individual ground rods.

WITH CADWELD

1. **Copper bar or cable can be permanently welded to copperweld or steel ground rods.**
2. **Copper bar can be joined flat (as illustrated) or on edge.**
3. **Length and drilling of disconnect lug can be varied and scrap copper bar can be used.**
4. **Connections cannot loosen or corrode.**
5. **Equipment is portable—IDEAL for field use—no outside source of power or heat required.**

***For the best in* ELECTRICAL CONNECTIONS**

ERICO PRODUCTS, INC.
2070 E. 61 St. PLACE CLEVELAND 3, OHIO

☐ Send Descriptive Literature on CADWELD Electrical Connections

☐ Have Representative Call

NAME POSITION

COMPANY

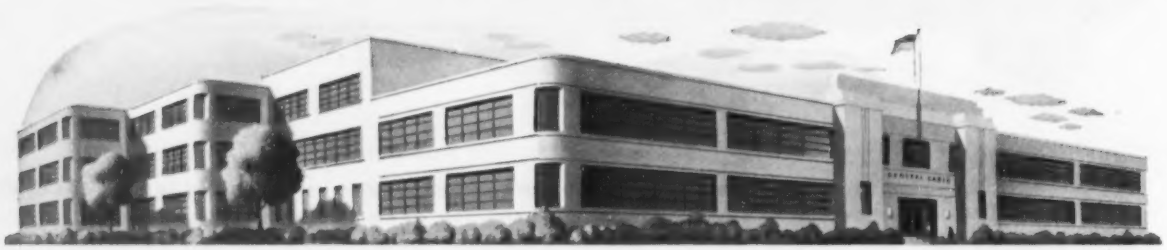
ADDRESS

CITY ZONE STATE

GENERAL CABLE

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

In the General Cable Laboratory



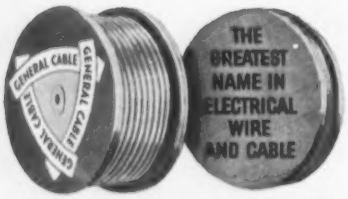
RESEARCH AND DEVELOPMENT

...unlimited

In 1882, General Cable established this basic policy: "Unfettered research and development is the only path to progress." This far-sighted philosophy has paid off for our customers and for us.

Today, the General Cable laboratory is the greatest single endeavor devoted exclusively to electrical wire and cable research and development.

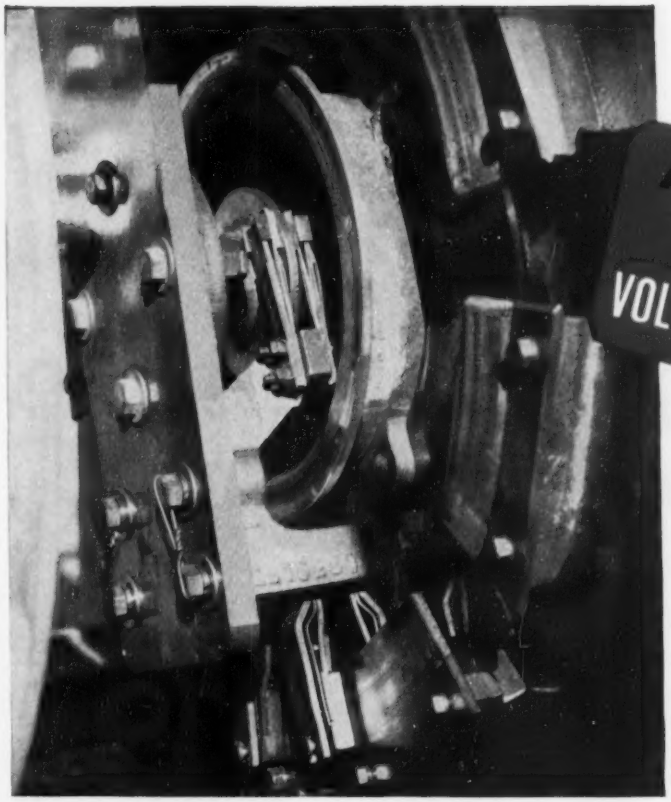
Most important—just as our staff of engineers...our network of distributors and stocks...and our manufacturing facilities are all at your immediate call, so too, are all of our research and development facilities. Whatever your wire and cable problem may be...you can be sure of our immediate and complete attention. If you have such a problem call or write us today.



BARE, WEATHERPROOF, INSULATED WIRES and CABLES FOR EVERY ELECTRICAL PURPOSE

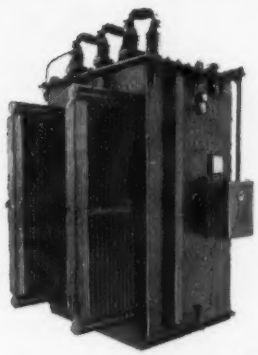
GENERAL CABLE CORPORATION

420 Lexington Avenue, New York 17, New York • Sales Offices: Atlanta • Buffalo Cambridge (Mass.) • Chicago • Cleveland • Dallas • Detroit • Greensboro (N. C.) • Houston Indianapolis • Kansas City • Los Angeles • Milwaukee • Minneapolis • New York • Newark (N. J.) • Philadelphia • Pittsburgh • Portland (Ore.) • Rome (N. Y.) • Rossmoyne (Ohio) (Cincinnati area) • St. Louis • San Francisco • Seattle • Syracuse • Tulsa • Washington, D. C.



Practically NO WEAR

AFTER 1,240,000 TAP CHANGES!



Three-Phase
Power Regulator

Single-Phase
Power Regulator

Single-Phase
Distribution Regulator

The unretouched photo above shows the excellent condition of the tap changer from an Allis-Chalmers power regulator after 17 years' operation.

This power regulator on a western utility was disassembled to permit replacing gaskets that were installed when the unit was built in 1937. After thorough inspection the unit was placed back in service.

This 17-year operating record adds field proof to the laboratory tests that have shown that the *Quick-Break* mechanism of Allis-Chalmers ⅝% step regulators will stand up under five million operations. You get reliability like this in Allis-Chalmers ⅝% step regulators because the *Quick-Break* mechanism is used in all of them. It provides fast, clean contact separation, snapping moving contacts from one contact to the next before there is time for damage to occur.

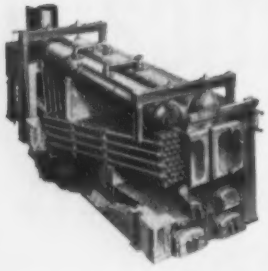
Get more information. It will pay to get complete facts on this rugged, reliable tap-changing mechanism. Contact the nearest A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4241

ALLIS-CHALMERS

Originators of ⅝% Step Regulation

75 years of progress

ASTORIA STATION GOES ON THE LINE



View of B&W Boiler for Thomas Edison's Pearl Street Station.

It is unlikely that Thomas A. Edison, genius that he was, ever envisaged 180-megawatt production from a single electric generating unit.

Yet today that is an accomplished fact in such outstanding plants as the new Astoria Station of Consolidated Edison Company, where the second B&W boiler to serve a 180-megawatt unit went on the line last month.

Now we are celebrating Light's Diamond Jubilee, and reminding all Americans of the electrical progress that has been so helpful to everyone in the short 75 years since Edison's Menlo Park experiments produced the first practical incandescent electric light.

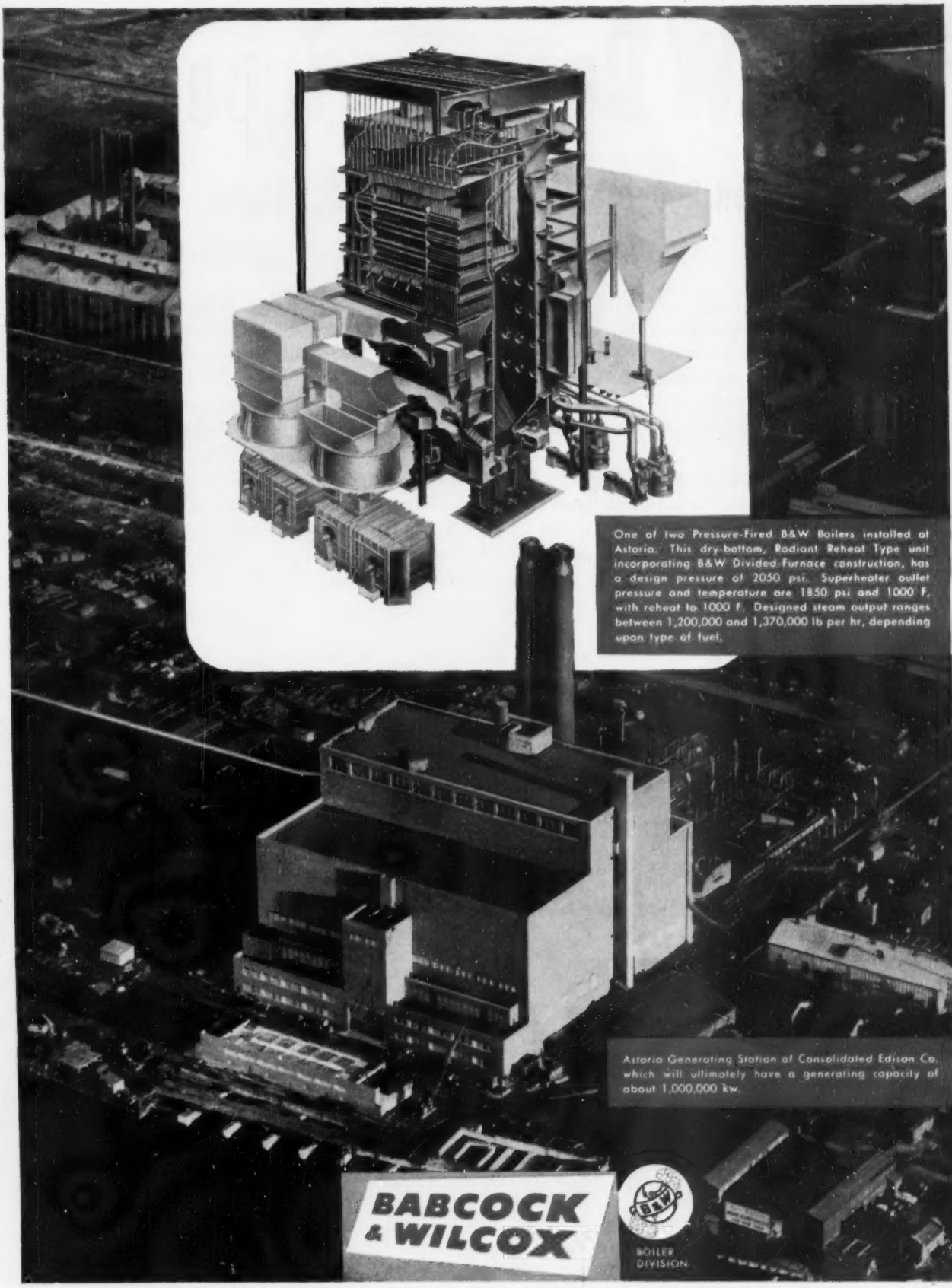
The public relations value of the Diamond Jubilee celebration is important, of course —and proper, too. But we at B&W believe that the electric power industry has good reason to celebrate the Diamond Jubilee for the sheer exuberance of looking back fondly and enthusiastically upon a great job well done—and of looking forward to a future that is limitless.

In only 75 years the lights that first glowed in Edison's Menlo Park Machine Shop have been multiplied by tens of millions across this country and the world. This could only have been accomplished by an industry so technically proficient and so dedicated to its public trust that each challenge has been met in turn, and each victory marked down as a foundation on which to build further.

Having supplied Edison with his boilers for Menlo Park, and a few years later for his Pearl Street Station, we at B&W are proud of our own continuing technical contributions such as Cyclone Furnaces, Pressure Firing, Cyclone Steam Separators, Coal Pulverizers and Divided Furnaces, that have helped the utilities produce more power for more people at lower cost than power pioneers ever dreamed of.

We may well pause to reflect on Menlo Park and Astoria Station—each a significant date in power generation, a significance made greater by the fact that each points in the same direction—to an expanding future.

G-443



One of two Pressure-Fired B&W Boilers installed at Astoria. This dry-bottom, Radiant Reheat Type unit incorporating B&W Divided-Furnace construction, has a design pressure of 2050 psi. Superheater outlet pressure and temperature are 1850 psi and 1000 F, with reheat to 1000 F. Designed steam output ranges between 1,200,000 and 1,370,000 lb per hr, depending upon type of fuel.

Astoria Generating Station of Consolidated Edison Co. which will ultimately have a generating capacity of about 1,000,000 kw.

BABCOCK & WILCOX

BOILER DIVISION

the NEW Sangamo Type J2

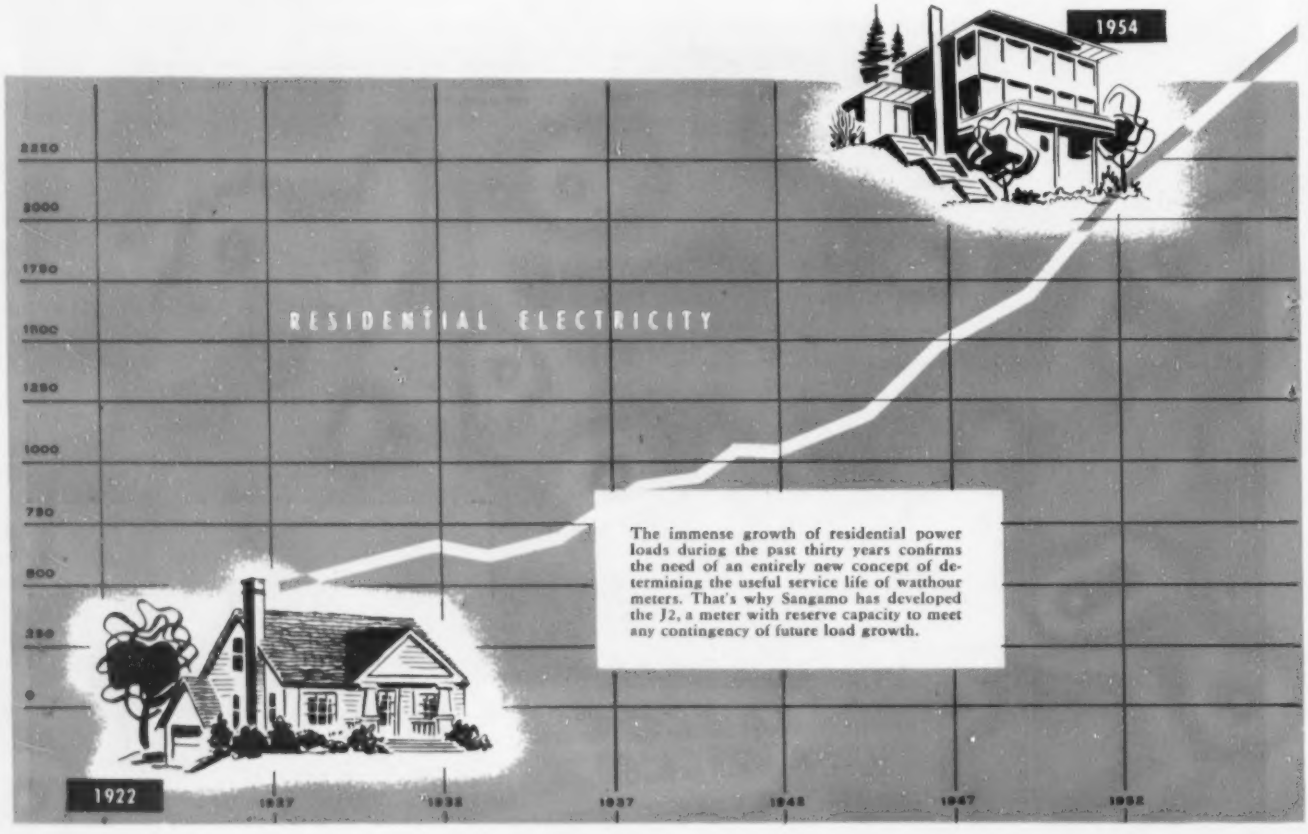
Extended Range Singlephase Watthour Meter

to measure the adequately wired loads of tomorrow

The nation's growing residential power load, built to tremendous proportions by the American consumer's increasing use of household appliances, has led to a crisis that the electrical industry is meeting by an effective adequate wiring program.

Adequate *measurement* of the loads of the future will require a watthour meter with straight line accuracy up to 100 amperes—a meter capable of handling all foreseeable increases in average residential consumption.

The new Sangamo Type J2 *is* such a meter. Its extended range will meet the requirements of accurate measurement for both today and the future. The J2 is not a *revolutionary* new meter, but an *evolutionary* development from the time-proven Sangamo Type J. It retains many features that contributed to the proven electrical and mechanical stability of the Type J. Added improvements all contribute to better and longer performance over an extended operating range.



The immense growth of residential power loads during the past thirty years confirms the need of an entirely new concept of determining the useful service life of watthour meters. That's why Sangamo has developed the J2, a meter with reserve capacity to meet any contingency of future load growth.

The new Sangamo J2 will protect your investment in new meters by providing sufficient reserve capacity to meet any contingency of future load growth—sustained accuracy with minimum maintenance during its entire life—at *no increase in cost or price.*

NOW...

with the Type J2, you get

- Accurate measurement to 100 amperes, without sacrifice of performance at light loads.
- Lower disk speed, but with same high torque as the time-proven Type J.
- Increased bearing life with improved bearing performance from a fraction of an ampere to 100 amperes.
- Higher resistance to repeated high voltage surges.
- Improved corrosion-resistant finishes and materials for better and longer performance in humid, salt-laden or corrosive industrial atmospheres.
- Plus all the features that have made Type J the Meterman's meter for fourteen years.

Sangamo presents the new J2 with full confidence that this singlephase watthour meter—the finest in Sangamo history—will prove a much needed advance in meter design.

Get the facts . . . mail the coupon below for your copy of "Protect your Investment in New Meters." It's just off the press, and gives the complete story of the evolution of the Sangamo Type J2 . . . the Meter with reserve capacity for growing loads.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

JM54-1

SANGAMO ELECTRIC COMPANY, SPRINGFIELD, ILLINOIS

Send my copy of "Protect Your Investment in New Meters"

NAME _____

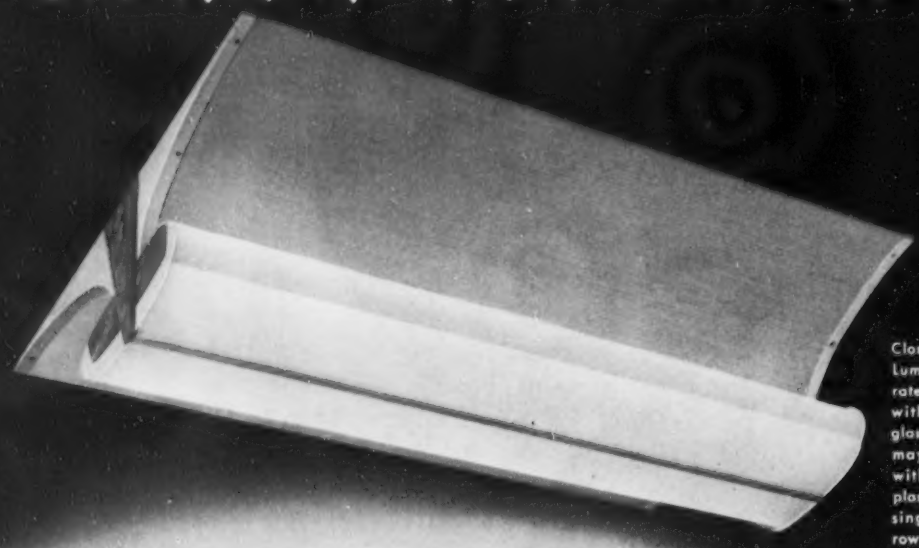
TITLE _____

COMPANY _____

ADDRESS _____

CITY and ZONE _____ STATE _____

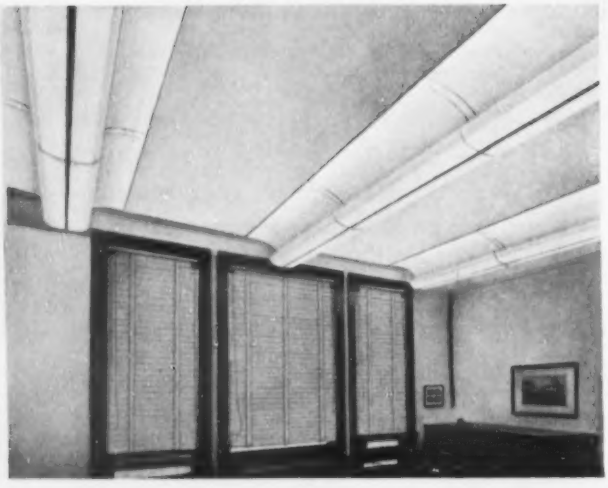
SYLVANIA ANNOUNCES—



Close-up of Sylvania Sono-Lume unit showing perforated metal wings backed with sound-deadening glass fiber batting. Fixtures may be also equipped with louvers instead of plastic shielding. Mounted singly or in continuous rows.

SONO-LUME*.....

the Fixture† which Controls Sight and Sound!



New fluorescent lighting fixture has built-in sound-conditioning system . . . easily installed!

Now Sylvania introduces SONO-LUME . . . a new concept of sight and sound control!

Basically, Sono-Lume is an attractive fluorescent fixture incorporating principles worked out by Sylvania engineers.

The perforated wings on each side of Sono-Lume fixtures are backed with glass fiber batting. This element has the excellent noise reduction coefficient of 0.85. Thus the fixture serves a double purpose: (1) It provides high levels of clear, soft, all-over illumination for comfortable seeing. (2) It holds unnecessary noise to low levels for comfortable hearing.

Saves modernization costs!

Sylvania Sono-Lume fixtures can be readily installed in any office, conference or consultation room. In instances where sound-proofing and better lighting are separate projects, this new combination fixture keeps costs well within modest budgets. A note on your letter-head will bring you detailed information. Simply address Dept. 4X-2810, at Sylvania.

*Sylvania Trade Mark
†Patent Pending

SYLVANIA

Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

In Canada: Sylvania Electric (Canada) Ltd., University Tower Bldg., St. Catherine Street, Montreal, P. Q.

LIGHTING · RADIO · ELECTRONICS · TELEVISION

Consider the unique K-Weld technique...

when critical piping is the order!

With today's operating conditions already approaching the limits of available power piping materials, the necessity for expert fabricating techniques cannot be overstressed. And it is here that the K-Weld process, Kellogg's unique welding method, has already played an important part.

For example, K-Weld was used throughout—both in the shop and in the field—for the welding of austenitic stainless steam piping for service at 1100°F and 2350 psig on two 145,000 Kw units in Kearny station of Public Service Electric and Gas Co. of New Jersey.

Main advantage of this new welding process lies in the fact that it assures *complete penetration without backing rings*. Their elimination precludes the possibility of crack propagation at the weld root which would produce ultimate failure as a result of severe operating conditions.

An additional advantage is the elimination of the possibility of the backing ring breaking off and damaging equipment. Furthermore the lack of a ring materially reduces turbulence in pipes.

The K-Weld process—developed in Kellogg's Welding and Welding Practices Group—entails the use of inert-gas arc welding of the first pass with inert-gas under *controlled pressure* on the inside of the piping. It permits an average welder qualified for inert-gas arc welding to obtain excellent results either in the field or in the shop. The K-Weld technique may be used on all power piping materials.

Fundamental development work leading to advances in the art of fabrication is an important part of Kellogg's basic stock in trade. Many power station designers and utility companies also say it's one basic reason why they time and again specify Kellogg when critical power piping is the order.

New Power Piping Booklet Published . . . Send for descriptive literature about Kellogg's extensive facilities for assuring the highest quality workmanship. A section of the booklet is devoted to detailed coverage of the K-Weld process.

OTHER FABRICATED PRODUCTS include: Pressure Vessels . . . Vacuum Vessels . . . Fractionating Columns . . . Drums and Shells . . . Heat Exchangers . . . Process Piping . . . Bends and Headers . . . Forged and Welded Fittings

These leading companies are among the many major producers of power who use M. W. KELLOGG POWER PIPING . . .

- Consumers Power Co.
- Detroit Edison Co.
- Dow Chemical Co.
- Elektricitetsselskabet Isefjardvaerket (Denmark)
- Ford Motor Co. of Canada Ltd. (Canada)
- General Electric Co.

For further information, details of methods, etc. contact

FABRICATED PRODUCTS DIVISION

THE M. W. KELLOGG COMPANY

225 Broadway, N. Y. 7, N. Y.

also Jersey City, Buffalo, Birmingham, Chicago, Los Angeles, Tulsa, Houston

In Canada—Toronto and Edmonton

In Europe—London and Paris

KELLOGG — A DIVISION OF PULLMAN INCORPORATED

Now!...

An INTERRUPTING RATING in EXCESS of 100,000 AMPERES *for every set of fuse clips in your plant* . . . simply by installing FUSETRON *dual-element* FUSES

The Biggest Electrical Protection NEWS Since BUSS invented the FUSETRON Dual-Element FUSE

FUSETRON is a trademark of the Bussmann Mfg. Co., Division of McGraw Electric Co.

In 1947 tests made by the Electrical Testing Laboratories of New York, showed that on a circuit set to deliver 50,000 amperes, FUSETRON fuses in all tests cleared the circuit safely.

50,000 amp. Interrupting Capacity in 1947
becomes
100,000 amp. Interrupting Capacity Today

After years of intensive development work on FUSETRON fuses new tests were conducted under conditions that simulated the most severe field conditions and these tests were witnessed and verified by the Electrical Testing Laboratories of New York.

On circuits set to deliver in excess of 100,000 amperes, 30 to 600 ampere, 250 and 600 volt FUSETRON dual-element Fuses on each and every test cleared the circuit without belching flame or venting hot gases and with comparatively little noise.

Oscillograms of these tests interpreted by the Electrical Testing Laboratories, showed that the total available amperes including the direct current component, reached values as great as 165,000 peak amperes on 240 volt tests and as high as 212,000 peak amperes on the 535 volt tests.

This indicates that an interrupting rating of 100,000 amperes for FUSETRON dual-element fuses is a conservative one.

No interference with time-lag

In the development work to increase interrupting capacity in FUSETRON fuses it was kept in mind that the time-current characteristic must be maintained. Time-lag is of utmost importance to give proper motor and electrical protection and to eliminate needless blowing of fuses.

Remarkable results have been achieved. Interrupting capacity has been greatly increased while the time-current characteristic of FUSETRON fuses has in no way been disturbed.

Play Safe – install Fusetron Fuses throughout the entire electrical system!

Think!...

ALL THIS ADDED SAFETY *without changing a panelboard or switch... plus* 10 Point Protection of FUSETRON *dual-element* FUSES!

Maximum Safety

With FUSETRON Fuses there is no cascading of interrupting rating — no places where an excessive fault current might cause serious damage. Every FUSETRON fuse has an interrupting rating in excess of 100,000 amperes.

You don't have to worry about selecting chosen spots in which to *pay extra* for "safe" equipment. Wherever a FUSETRON fuse is installed you have safety as sure and dependable as you can buy — no matter what you pay.

No Maintenance Costs

When FUSETRON fuses have once been installed properly you can forget about them. They need no periodic inspections to see if they will operate safely.

Dust, fumes, corrosion or age cannot prevent a FUSETRON fuse from opening safely. There are no hinges, pivots or contacts to stick or slow down the operation of the fuse on short-circuit.

With FUSETRON fuses — you get safety — without one cent spent for inspection or maintenance costs.

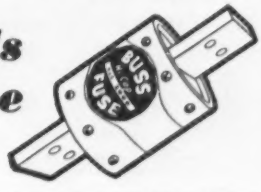
No Recalibration Costs

When a FUSETRON fuse does blow, there is no recalibration needed. As quickly as the fault in the circuit is corrected, you slip in a new fuse that has been CALIBRATED AT THE FACTORY BY ENGINEERS—a fuse that is as safe and dependable as the one that blew.

PLUS 10 POINT Protection with FUSETRON dual-element FUSES

1 Protect against short-circuits. **2** Protect against needless blows caused by harmless overloads. **3** Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation. **4** Provide thermal protection — for panels and switches against damage from heating due to poor contact. **5** Protect motors against burnout from overloading. **6** Protect motors against burnout due to single phasing. **7** Give DOUBLE burnout protection to large motors — without extra cost. **8** Make protection of small motors simple and inexpensive. **9** Protect against waste of space and money — permit use of proper size switches and panels. **10** Protect coils, transformers and solenoids against burnout.

for SAFE PROTECTION on loads above 600 and up to 5000 Ampere install BUSS Hi-Cap FUSES



Tests have shown that BUSS Hi-Cap fuses have unlimited interrupting capacity on circuits of 600 volts or less.

They are designed to give protection against dangerous overloads as well as high fault currents — yet their speed of operation on heavy shorts limits currents to safe values. This minimizes damage to equipment and cuts down dangerous stresses on transformers.

When coordinated properly with FUSETRON dual-element fuses they will not open ahead of the fuses nearest to the fault. Thus trouble is isolated to the part of the circuit in which the fault occurs.

Added SAFETY on Old Installations

On installations where the increase in the capacity of the circuit has outgrown the interrupting rating of the circuit breakers, BUSS Hi-Cap fuses offer a safe and relatively inexpensive way to protect inadequate breakers against rupture in event of a bad fault.

ACTION THAT SAVES YOU MONEY

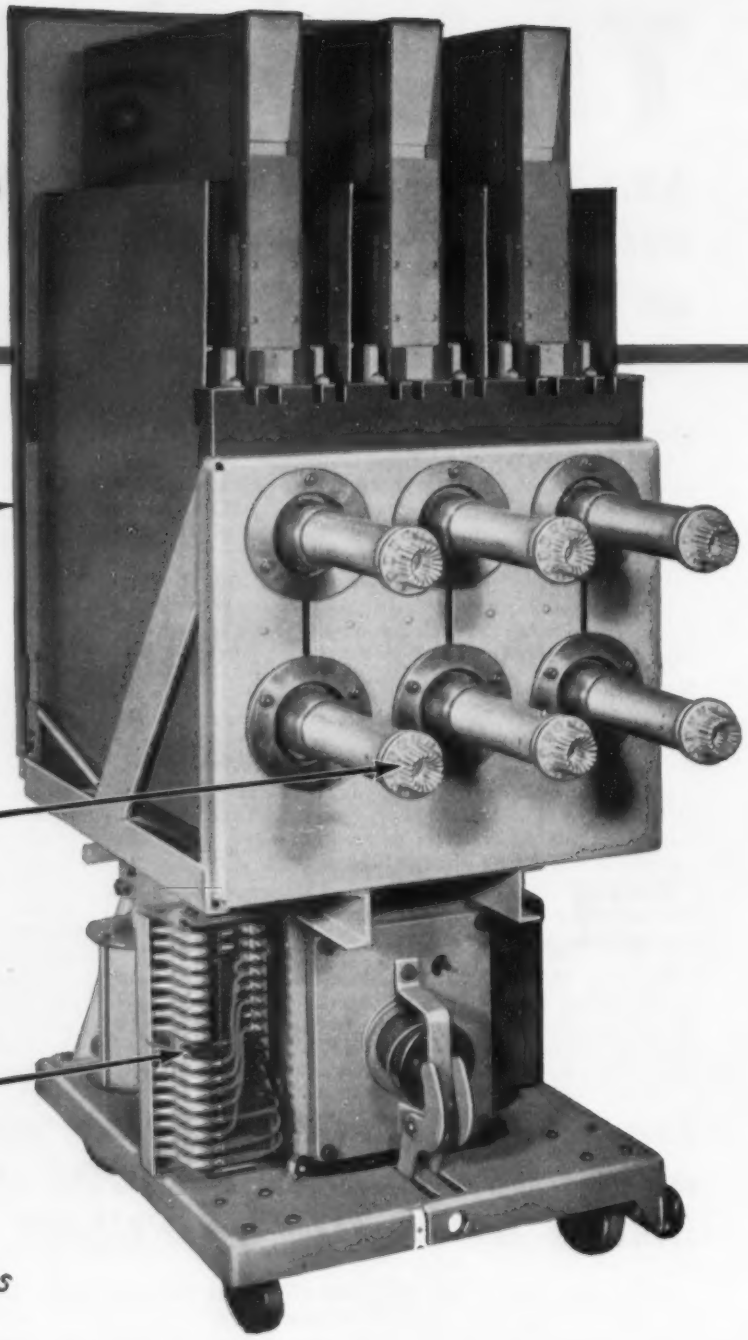
By passing the word along that all purchase and stock records should call for FUSETRON fuses on loads up to 600 amps—and BUSS Hi-Cap fuses on loads above that — you get action that begets money saving.

For blowing time charts or more information on FUSETRON Fuses and BUSS Hi-Cap Fuses write for Bulletins FIS and HCS.

Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo. Division McGraw Electric Company

ALLIS-CHALMERS

PROGRESS IN Switchgear



Safety first! Steel panel in front completely seals off high voltage members

Primary contact fingers are on bushing of movable portion ... easy, safe to inspect

Secondary disconnects are direct-connected to auxiliary switches- eliminating wiring

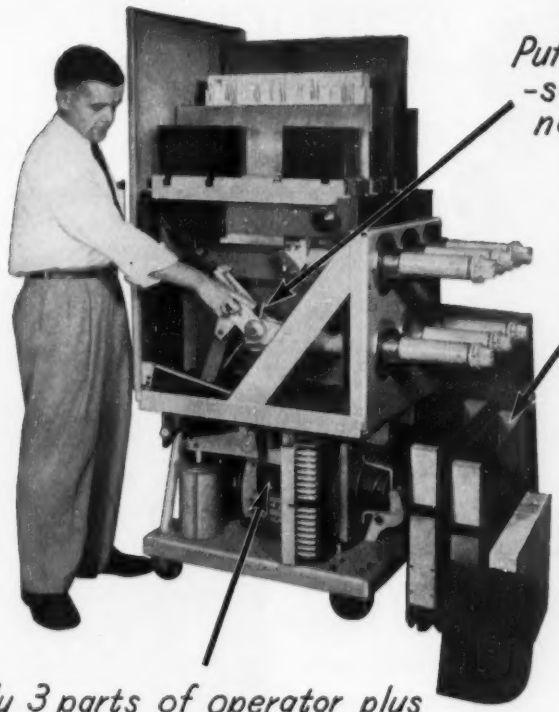
Shorter interrupting times for low currents

For additional information on this outstanding new breaker, call your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4175

ALLIS-

engineering notes on

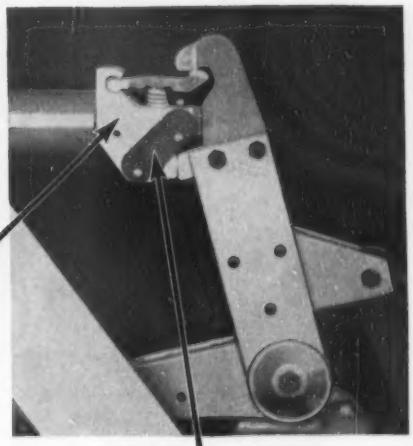
New 13.8-Kv Breaker



Puffer at ground potential -separately mounted- not on moving part

Each part of arc chute assembly is separately movable and can be conveniently handled by one man

Only 3 parts of operator plus armature move on closing operation: latch and trip-free link plus 3 parts of operator move during opening



Contacts are blow-on type. Magnetic field is arranged so that contact pressure increases as current increases

Access to contacts may be made by removing this insulated cover

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the only insulators..

TIE-WIRE
LINE POST
WITH EXTERNALLY-ATTACHED
BASE

CLAMP-TOP
LINE POST
WITH EXTERNALLY-ATTACHED
CAP AND BASE

STATION POST
WITH EXTERNALLY-ATTACHED
CAP AND BASE

. . FOR TRANSMISSION LINE AND STATION USE . . .

built to take advantage of the inherent strength of porcelain

CHARACTERISTICS OF LAPP VACUUM-PROCESS PORCELAIN:

Specific Gravity	2.41
Density	.087 lbs. per cu. in.
Porosity	Zero
■ **Compression Strength**	**100,000 lbs. per sq. in.**
■ **Tensile Strength**	**5,000 to 8,000 lbs. per sq. in.**
Modulus of Rupture—Glazed	15,000 lbs. per sq. in.
Modulus of Rupture—Unglazed	10,500 lbs. per sq. in.
Linear Thermal Expansion	3.23×10^{-6} per °F, 0-600°F
Puncture Strength	
—3/8" Uniform Sections	250 Kv per in.
—1" Uniform Sections	170 Kv per in.
Dielectric Constant (1000 cycles)	6.33
Power Factor (1000 kilocycles)	.8%

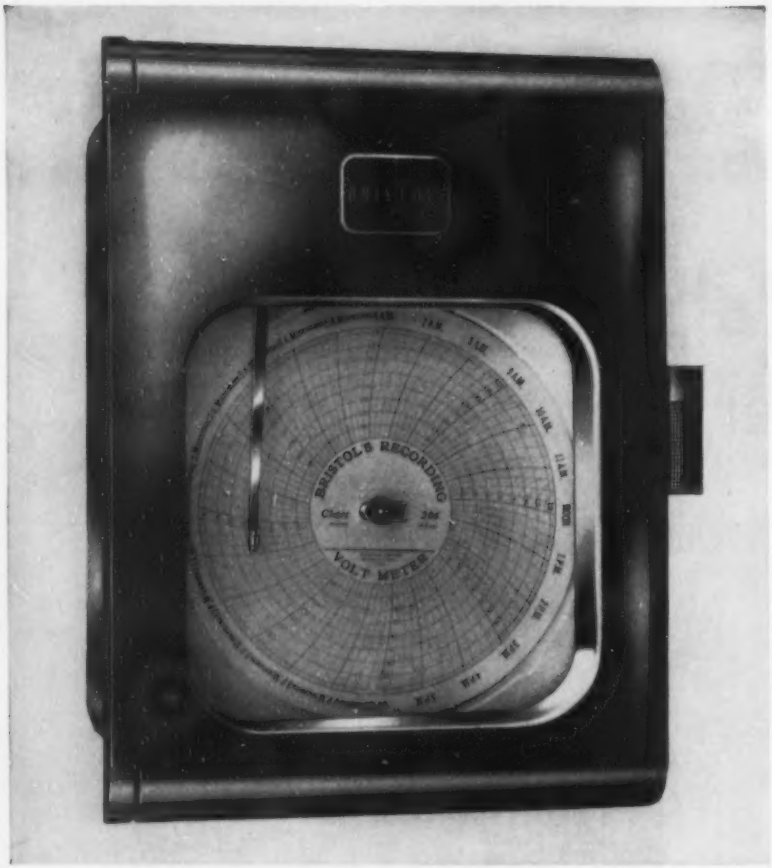
Cracking of insulator porcelain is characteristically and ultimately caused by tension-loading of the porcelain resulting from relative thermal movement. Any insulator of nested porcelain parts, with internal pins, or metal inserts, must be protected against cracking by extra-thick cushions of paint, or other devices of questionable mechanical security.

A fundamental concept from the beginning of the Lapp "Post" idea has been the *elimination of the causes* of such tension-loading. *No nested porcelain parts . . . no pins . . . no metal inserts.* All hardware is externally attached, so that porcelain can be loaded only in compression—in which it is from 12 to 20 times as strong as it is in tension.

Even in cantilever, the loading is distributed over the much larger, low-intensity area of gripping attachment, as compared with the relatively smaller-area higher-intensity loading on porcelains of insulators which have internally-attached pins or inserts.

You can specify Lapp Station Posts . . . Lapp Line Posts with conventional tie-wire head . . . or the new Clamp-Top Lapp Line Posts . . . with confidence in their extra margin of operating security, long life, and low upkeep. Lapp Insulator Co., Inc., LeRoy, N.Y.

Lapp



NEW, EASY-TO-READ BRISTOL RECORDING VOLTMETERS AND AMMETERS are available for permanent mounting or for use as portable instruments.

You'll get greater accuracy, greater dependability with Bristol recording voltmeters and ammeters

Here's why:

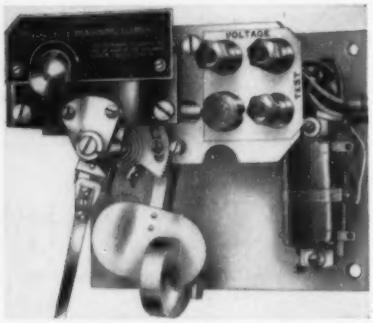
1. Low electrical burden – the lowest burden of any round-chart recorder on the market.
2. Extremely high torque gradient.
3. Temperature compensation.
4. Shock-proof measuring mechanism mounting.
5. Leveling of instrument not critical.
6. Continuously legible recording of sudden changes – up to full scale value.

These modern units are designed for easy use, with dust- and moisture-proof die-cast aluminum case; quick-set chart hub for easy chart changing; non-obscuring pen lifter; and snap-on chart plate.

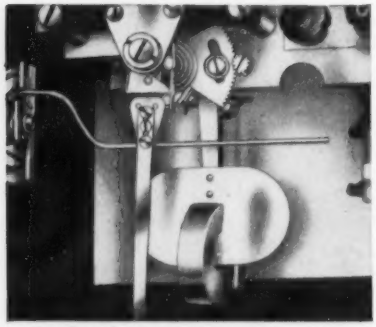
Get the whole story on these precision instruments. Write today for free 28-page Bulletin E1111 to THE BRISTOL COMPANY, 116 Bristol Road, Waterbury 20, Conn.

Many ranges carried in stock for immediate delivery

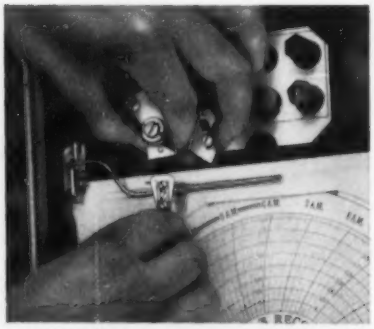
LOOK AT THESE FEATURES!



NEW MEASURING MECHANISM – High-quality, accurate, dependable Bristol moving-iron mechanism used in all models.



MAGNETIC DAMPING – all models equipped with aluminum vane and alnico magnet damper which gives maximum speed of response possible with minimum overshoot.



PEN MOUNTING – Pen-arm mounting shaft firmly supported at both ends – eliminates trouble from back-lash and lost motion. Pen arm is readily removed and replaced.

BRISTOL

POINTS THE WAY IN HUMAN-ENGINEERED INSTRUMENTATION

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

connections by

BURNDY

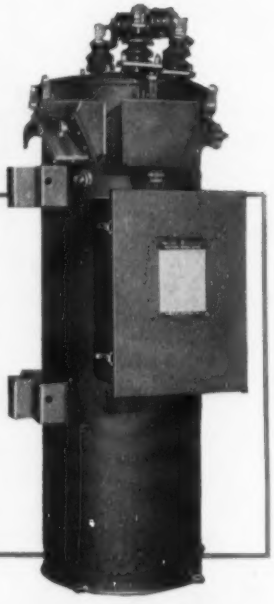
NORWALK, CONNECT. FACTORIES: NEW YORK, CALIFORNIA, TORONTO **TORONTO, CANADA**

EXPORT: PHILIPS EXPORT CORPORATION

54-2

Electrical appliances were the answer to her problem, but it was only the beginning for the utility. All the neighbors had the same idea and first thing you knew the utility was really having its "up and downs" . . . voltages that is.

Fortunately this problem is easy to overcome with a Moloney Pole-Type Step Voltage Regulator. Designed for just such contingencies . . . which are more or less commonplace today . . . utilities can install them along the line where needed and obtain constant voltages regardless of the peak or off-peak cycle.



CHECK THESE MOLONEY POLE-TYPE STEP VOLTAGE REGULATOR FEATURES . . .

- ✓ Hipercore Wound Core Design
- ✓ Completely Oil Immersed Unit
- ✓ Completely Self Contained
- ✓ Greater Arc Clearances
- ✓ Spring Loaded Action on the Selector Switch
- ✓ Fully Automatic Operation
- ✓ Sensitive, Accurate Control System
- ✓ Flexible Control Cabinet Mounting
- ✓ Quick, Easy Installation
- ✓ Long, Trouble-Free Operating Life

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Step Voltage Regulators • Regulating Transformers • Load Ratio Control Transformers • Unit Substations • Network Transformers • Constant Current Transformers • Capacitors • Transformers For Electronics

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Meeting Demand Is Not Enough

"When the instinct and inspiration for selling disappear, particularly when they disappear from a power company, that company is liquidating itself."

Harllee Branch, Jr, president of Georgia Power Co, said that—Electrical World, Jan. 18, page 25.

"An electric utility should concentrate on producing an adequate supply of electric energy in the most efficient manner. It should also interpret the uses to which this energy may be put. To concentrate on this two-fold task under today's inflationary conditions, the utility must rely on manufacturers and distributors of electrical utilization goods to make, promote, and sell their products."

George N. Hawley, vice president of Southern California Edison Co, said that— Electrical World, March 1, page 47.

These two statements seem to be poles apart. Actually, the difference between them is in emphasis. Certainly, Georgia Power is putting every possible effort into "producing an adequate supply of electric energy in the most efficient manner." Certainly also, Southern California Edison's "interpretation" of the uses of electricity includes a large element of selling. Thus the two points of view are not really so widely separated as the quotations indicate.

However, the difference in emphasis is important. It points to the too prevalent tendency in management thinking to regard the utility function as simply the supply of electricity. Through the war and up to quite recently, utilities were unable to obtain enough of the materials and equipment they needed to cope without strain with the demands imposed on them. After nearly a decade of struggling to carry the loads piled on them, it is understandable that success in that should seem to many to be the sole aim of utility management.

But now the situation is eased. Materials and equipment for capacity expansion are readily available. No longer is utility management forced to limit its function to meeting demand alone. It is free to undertake the responsibility it should assume as an exponent of enterprise. In addition to meeting demand, it should undertake the job of creating demand.

Electrical World believes that if utility management avoids, for whatever reasons, its responsibility for creating demand for electricity, then it is not doing its share towards continuing prosperity for the industry and for the nation. That belief has been abundantly demonstrated by the many articles and editorials preaching selling the magazine has printed. Electrical World stands with Mr Branch and thinks that Mr Hawley is not so far away as he seems from his quoted words.

Rate of Return vs Cost of Money

In a recent article appearing in this magazine it was claimed that on the basis of economic depreciation alone the industry's rate of return should have been 7.5% instead of 5.5% earned in 1952. In other words, the additional 2.0% return was suggested as a way to cover one of the principal elements of risk and one which affects the utility industry to a far greater extent than other enterprises; namely, the recovery of economic costs of property.

The allowed rate of return itself is often predicated on the erroneous theory that as long as a utility is capable of attracting capital its financial condition is sound and no additional earnings are needed. This argument overlooks the ability of any enterprise to attract capital on some terms. Even bankrupt utilities, those in the transportation field for example, have been able to operate almost indefinitely on the basis of attracting capital by means of receiver's certificates. But the ability to go deeper into debt certainly provides no reasonable measure of the level of earnings required to maintain a financially sound utility enterprise.

The attraction of capital theory to which many commissions adhere also ignores the requirement for fairness to the past investor. The very concept of a fair rate of return can in fact apply only to the past investor because new investors are in a position to dictate the terms on which they are willing to put their money into a utility enterprise. As the result of the inflation since 1940, capital which is attracted supplies only a fraction of the buying power of capital invested at earlier price levels. Yet many commissions settle on the cost of money approach which aims at maintaining only the book value of the existing equity without consideration for the much greater value, in terms of current dollars, which this investment represents.

Furthermore, because of the regulatory method, the utility industry's future earnings are set in accordance with the cost of money existing during the war and post-war inflation periods when utility earnings were artificially depressed. There is little, if any, reflection of the value of service in the market or of any of those factors, enumerated above, which consequently enter into a valid determination of the rate of return.

In addition, it should not be forgotten that the Supreme Court itself condemned the use of earnings criteria as a method for setting a new level of earnings as being cyclical in nature and hence self-defeating in purpose and effect. Yet in spite of all this the cost of money component is still considered by many as being the only factor involved in the determination of the rate of return.

It seems that the time is ripe for a careful review of these regulatory practices in terms of today's conditions.

The Editors Become Pedantic

This is annual report time. The report of practically every electric company has mention of new all-time highs in peak load, total generation, number of customers, sales, and income.—Such pessimism!

Electrical World editors choose to believe that those who prepared the reports were mistaken. Those were not "all-time highs." They were merely new records, great achievements, outstanding accomplishments. They were only steps toward the "all-time highs" that are now too far distant to be visualized or even imagined.

And if readers believe that this is splitting hairs, they must remember that at times all editors are pedantic.

National Lighting Bureau Gets Going

After an incubation period of a year and a half, a national program for relighting commercial and industrial establishments to modern standards has broken its shell and is emitting its first chirps. Since the war many voices have been raised bewailing the sad state of lighting in the nation's stores, offices, factories, schools. Resulting therefrom, the Planned Lighting activity was launched in 1947. Remember it, "PL—PL," "The Man Who Plans?"

But this activity was not what even its most partisan defender could call conspicuously successful. After the initial blare of trumpets and thudding of drums, the parade sort of bogged down, never did get very far on the way it was pointed. Possibly it was not timed right, was started too soon after the war. Possibly it lacked some essential element. Whatever the reason, it did not make the grade.

Testimony to this effect came from that much-publicized survey made in 1950—in the average American city 85% or more of commercial and industrial lighting below minimum IES recommendations, a third of it below the standards of the time of World War I. Very little relighting being done, and of that little only half having the benefit of any kind of professional advice, only about a tenth of it initiated by sales effort.

So now we have the National Lighting Bureau, organized by the Industrial and Commercial Lighting Equipment Section of Nema and with an advisory board consisting of representatives of other national electrical industry associations and of lamp makers. In the coming months the bureau will select three pilot cities—large, medium and small—in which local bureaus will be set up. In these cities, test runs of the program—training classes, certification, and promotion—will be started next September. Then maybe by this time next year we'll have an idea of the effectiveness of this manner of attack on the problem of antiquated lighting.

This We Believe About Education

The importance of public school education in the United States cannot be belittled. With this in mind the National Association of Manufacturers has had a special committee of educators and industrialists making a two-year study of major controversial issues concerning education in the United States. The results of this study have just been published in a booklet, "This We Believe About Education."

The 32-page booklet is a plea for common sense in appraising America's schools. It advocates reason instead of emotion in the study of such vigorously debated subjects as the basic purposes of education, the rights of teachers, objective teaching vs indoctrination, academic freedom, and the investigation of charges against schools and educators.

For a copy of this booklet write the National Association of Manufacturers, 14 West 49th St., New York 20, N. Y.

THE ELECTRICAL WEEK

The Issue's News Highlights . . . Two restrictions on TVA's power marketing and expansion programs were tentatively knocked out of a bill now before the House providing funds for next year's operations.

It looks as though AEC will get all the funds asked to go ahead with its five-year reactor program.

Public power groups ask Senate Public Works Committee to write preference clause into any bill authorizing further development of the Niagara.

Westinghouse and General Electric announced they would pass excise tax cuts on light bulbs and appliances along to their customers in full. President Eisenhower signed the excise-cutting bill, which he originally opposed, and the new rates became effective April 1. The new law reduced the tax on appliances from 10% to 5%, tax on light bulbs, radio and television tubes from 20% to 10% (See Page 95).

Washington State may begin action within six months to acquire federal dams within its borders, Gov Arthur B. Langlie told a press conference. "Power revenues from Grand Coulee and Chief Joseph Dams," he mused, "could do a lot of things for the state."

The "partnership plan" idea is beginning to catch on in the Pacific Northwest, although Democratic Congressmen don't like it. Pacific P&L and Mountain States Power, presently in the process of merging, have offered to finance power facilities for Green Peter Dam in Oregon. City of Eugene wants to develop power at Cougar Project there. Portland General Electric wants to negotiate a deal for "partnership" development of John Day Dam on the Columbia. In all three instances, the federal government would pay for flood control features.

In describing some rather cutting committee action on TVA appropriations, Rep John Phillips, California Republican, told the House: "We have no thought of sending this calf to the butcher, all we are trying to do is wean it." For House action, see Page 88.

An all-electronic fault finder (EW, March 29, p 39) located simulated faults on a 142-mile double circuit 220-kv line of the Pacific G&E system to the faulted tower in two tests and within 500 ft on a third.

The first atomic energy "catalogue" for plants was released by North American Aviation Co. Though no power reactors are listed, the company offers to build, subject to AEC approval, nuclear plants for research in industry, medicine and academic study.

Washington State Power Commission has tabled application of 14 PUD's and seven municipalities to organize the first "operating agency" under the 1953 power law. Plan was to pool resources to build dams.

Off the Washington Wire . . . Piled on top of all its other electric power demands, AEC needs an addition 200,000 kw for a secret project somewhere in the TVA area—presumably at Oak Ridge.

Opponents of the St Lawrence Power Project license held by the New York Power Authority have until early May to contest it before the Supreme Court. They had made no formal move as of last week.

Since last July 1, REA has approved 208 electrification loans totalling $106.6 million, of which $18 million was for generation and transmission facilities. This is the same number of loans as approved by the previous administration during a similar period in the previous fiscal year, but in dollars amounts to nearly $1 million more.

Interior department has authorized Reclamation Bureau to go ahead with negotiations for power sales contracts in the Western Division of the Missouri River Basin. Government officials met with power customers in Denver in March to discuss future power needs and tentative allocation plans for this division.

The pressurized water reactor, which is the joint Westinghouse-Duquesne venture in the atomic power field, has been voted least likely to succeed in the current AEC program. Seventeen expert witnesses before the Joint Atomic Energy Committee did the voting. Their first choice: the homogeneous reactor.

If the Niagara issue were put to a vote in New York State, Robert Moses, chairman of New York State Power Authority, says, "not 10% of the people would favor giving a license to the private power companies." Wanna bet.

Cleveland Electric Illuminating and Local 270 UWU-CIO agreed to submit contract differences to impartial arbitration. Union wants 9¢ across-the-board plus fringe benefits, company offers 3% (4¢ to 9¢ an hour) increase with no fringes. Contract expired last week.

Inter-union fight for control of 20,000 workers at General Electric's Schenectady plant—IUE-CIO vs. UE-Ind.—led the company to announce it would recognize none of the opposing union leaders until victors are determined officially by NLRB. GE said it would continue to recognize lower-echelon stewards elected by workers in each plant-division, so that grievances could be handled as usual.

Executive Changes—Central Hudson Gas & Electric Corp promoted Ernest E. Althouse from general operating manager to vice president in charge of operations. George H. Landis, chief engineer, was named VP of engineering . . . W. F. Mainguy, executive vice president of Shawinigan Water & Power, was elected a vice president of its subsidiary, Quebec Power.

House Debates TVA Budget, Policies

Moves to strip authority of control of resale rates and to require interest payments on investment tentatively rejected

Long-seething battle over Tennessee Valley Authority's power marketing policies and future power expansion broke into the open on the House floor last week.

Immediately at issue were two House Appropriations Committee recommendations directing TVA to:

- Pay interest on its $641,799,057 power investment.
- Give up authority exercised over the resale rates of its utility customers.

On points of order, House tentatively rejected both proposals. TVA backers argued successfully riders should not be part of appropriations bill. As EW went to press, House was preparing to act on amendment raising TVA appropriation $85 million above committee-approved figure.

Expansion at Stake . . . Underneath these controversial surface issues is a sustained fight over future power expansion by TVA. The House committee recommended an appropriation of $103.5 million for the agency during the next fiscal year. This was $84.7 million less than the amount voted for the current fiscal year, and $38.2 million under the figure requested in President Eisenhower's budget message.

The funds recommended by the committee would permit the agency to continue construction on 26 power units, of which 22 are steam units in 16 steam plants. No funds were recommended for the initiation of any new power units.

Still out was the proposed 450,000 kw Fulton steam plant north of Memphis, which has become symbol of future TVA power expansion.

No Actual Slowdown . . . Cuts recommended by the committee in the budget requests would amount to a bookkeeping transaction rather than an actual construction slowdown. The House group urged that $12 million requested for transmission construction be taken from TVA corporate funds (power revenues) instead of from direct appropriations.

Other major cut recommended was a $25 million decrease in the balance of funds to be carried over into subsequent years or held as a reserve for contingencies. Even with the cut, there will still be $21.8 million for these purposes.

With committee action pointing toward an eventual closeout of TVA power construction, the agency would presumably have to look to outside sources to supply the expected load increases in its service area.

Offers by Utilities . . . The committee hearings brought out five offers by electric companies in surrounding areas to furnish capacity for the expected loads. Utility spokesmen indicated they could furnish anywhere from 100,000 kw to 600,000 kw at various connections with the TVA system.

Most comprehensive offer was disclosed by Atomic Energy Commission General Manager K. D. Nichols at a hearing related to the TVA situation. This offer was made by Middle South Utilities Co and the Southern Co. Under it the two companies would build a plant across the Mississippi River from Memphis for the delivery of as much as 600,000 kw into the TVA system for use by AEC. The sale would be to AEC, but this would supposedly relieve TVA of commitments in that amount to AEC.

Further testimony by Nichols revealed that AEC is reluctant to set aside any of its present contracts with TVA in favor of the Middle South-Southern proposal. Said Nichols:

"We feel that the justification for canceling an existing firm contract (with TVA) and contracting for the same amount of power at higher costs should be made by a higher authority than AEC."

A separate offer to sell power directly to TVA came from E. A. Yates, chairman of the board of the Southern Co. He said Georgia Power Co could build a steam plant on the Tennessee River and sell as much as 200,000 kw to TVA for an average rate of 5.32 mills per kwhr at an annual load factor of 90%.

MOCK GROUND-BREAKING CEREMONY held last October at site of proposed Fulton steam plant caused comment at House committee hearings on TVA appropriations. Those participating were (l to r) TVA head Gordon Clapp; Neander W. Wade, Memphis Light, Gas, & Water Commission; Dr J. S. Scott, mayor of Ripley, Tenn; and Sen Lister Hill of Alabama

Graham Claytor, executive vice president of the American Gas & Electric Service Co testified that AG&E subsidiaries would be able to furnish between 100,000 and 250,000 kw to the northeastern portion of the TVA system over the next few years.

R. B. Wilson, vice president of Mississippi Power & Light Co said his company could furnish TVA immediately with 100,000 kw of capacity and with additional transmission facilities would be able to pump as much as 250,000 kw into the TVA system.

L. V. Sutton, president of Carolina Power & Light Co, said his company might furnish some power to the eastern portion of the TVA system.

Plead for Fulton Plant . . . TVA backers headed by Gov. Frank G. Clement of Tennessee stood firm behind construction of the Fulton plant. Clement told the House group that even with the diversion of 600,000 kw from AEC commitments, TVA still would not be able to keep pace with valley power demands.

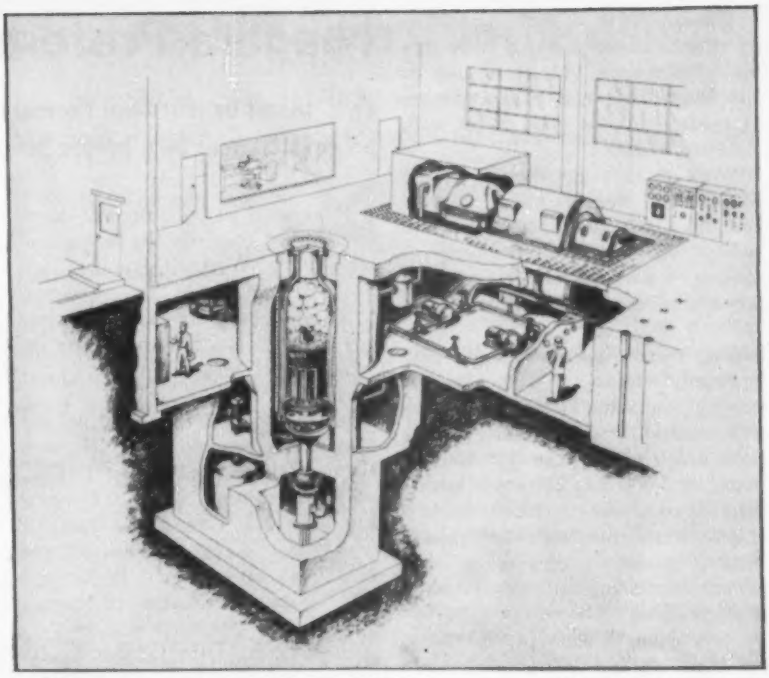
Only break in the dead serious hearings over TVA's future came in an exchange between Clapp and Republican Rep. Charles Jonas of North Carolina. Jonas wanted to know why Clapp had posed for pictures of a make-believe ground-breaking at the Fulton site.

Clapp explained he had arranged a trip for Sen. Lister Hill (D-Ala.), inviting news photographers along. He had watched the horseplay when a member of the Memphis Division of Power had wielded a shovel at the mock ceremony. No funds have been spent by TVA at the Fulton site, Clapp assured the Congressmen.

Then Clapp added: "It will be a great day when we do break ground on the Fulton site."

Correction

In a note on the author of "On Taiwan" (March 29, p 16), Electrical World stated that T. C. Tsao "guided redevelopment of the power system on Taiwan." This was in error. Tsao took no official part in development of the Taiwan power system, but was consulted on an unofficial basis only. System development there was guided by the engineering staff of Taiwan Power Co, Tsao said last week.



SKETCH of boiling water reactor power plant shows pressure vessel (tall, cylindrical tank in center of picture) which has been cut away to reveal uranium fuel assemblies and water being converted into steam. Steam is carried to turbine and generator (upper right). Condenser and pumps for returning water to reactor are below turbine and generator. Holes in concrete on right are for storing radioactive partly used fuel elements, pending disposal

AEC Speeds Reactor Plans

With a flashing green light from Congress, Atomic Energy Commission is going full speed ahead on its five-year power reactor program (EW, March 15, p 7).

Plans were recently unveiled for initiation shortly of the second and third atomic fireboxes in the five-reactor program. In addition, preliminary work is going ahead on an AEC-Army sponsored "package" reactor with a capacity of 1,000 kw.

Full Support Urged . . . On the Congressional front, the Joint Committee on Atomic Energy adopted the recommendation of its subcommittee urging full support of the five-year program. This is tantamount to Congressional authorization of the program.

At the same time, the usually tight-fisted House Appropriations Committee recommended that an additional $7 million be provided to initiate new starts on the experimental reactors. This action practically assures sufficient funds to carry out the program at the pace urged by AEC.

The proposed program calls for a $190 million research, development and construction program on power type reactor of which $85 million would go to the pressurized water reactor (PWR) being constructed by Westinghouse Electric Corp and Duquesne Light Co (EW, March 22, p 90). Funds for initiation of the PWR were provided last year, and an additional $45 million would be made available for the project this year if House funds committee recommendations are approved.

Package Reactor . . . Of the $7 million recommended for new power reactor starts this year, $2 to $3 million likely will go for the Army-AEC package reactor, which is not a part of the five-year program.

Recently disclosed testimony before the House Appropriations committee indicates the total cost of the 1,000 kw reactor will be less than $3 million and the initial fuel loading will run another $1 million. The "package" is being designed so that it could be dismantled for air shipment, or placed on a barge for actual operation.

This reactor is to be manufactured by private concerns on a lump-sum bid. Preliminary bids were due in late March, but neither the number of bidders nor the price range were disclosed by AEC.

Work is to begin shortly on the $17-million "boiling water" reactor and the $10-million sodium graphite reactor, both a part of the program looking toward economical electric power from atomic sources.

Boiling Water Experiment . . . AEC is already selecting an architect-engineering contractor and a site for the experimental "boiling water" experiment which will have an electrical capacity of 5,000 kw. Project is scheduled for completion in 1956.

This novel, medium-range experimental reactor is a possible step toward eliminating the costly primary heating circuit. The design calls for the production of steam in the reactor for direct use in a turbogenerator.

One of the theoretical drawbacks to this type of operation was that boiling in the reactor core would cause continual changes in reactivity and might result in unstable operation. Another was that steam might carry enough radioactivity to damage turbogenerator and other mechanisms.

Experiments with a small temporary reactor at the Argonne National Laboratory in Idaho indicate that a reactor of this type may be designed to operate in a self-regulating manner to provide stable generating conditions. Second possible drawback is to be tested with larger scale model, also to be designed by Argonne.

Sodium-Graphite Model . . . Third power-type reactor on the AEC program is a sodium-graphite experimental model with a heat capacity of 20,000 kw. There are no present plans to convert heat from this reactor into electricity.

An agreement has already been reached between AEC and North American Aviation Co for construction of this reactor, which is also to begin experimental operation in 1956. Under the agreement, AEC will furnish $7.5 million of the costs and North American, $2.5 million.

As the name suggests, the reactor will be sodium-cooled and graphite moderated. It will use metallic fuel elements of either slightly enriched uranium or a combination of thorium and uranium 233.

Niagara Preference Clause . . .

. . . asked by National Farmers' Union and NRECA at hearings on development bills before Senate Public Works Committee

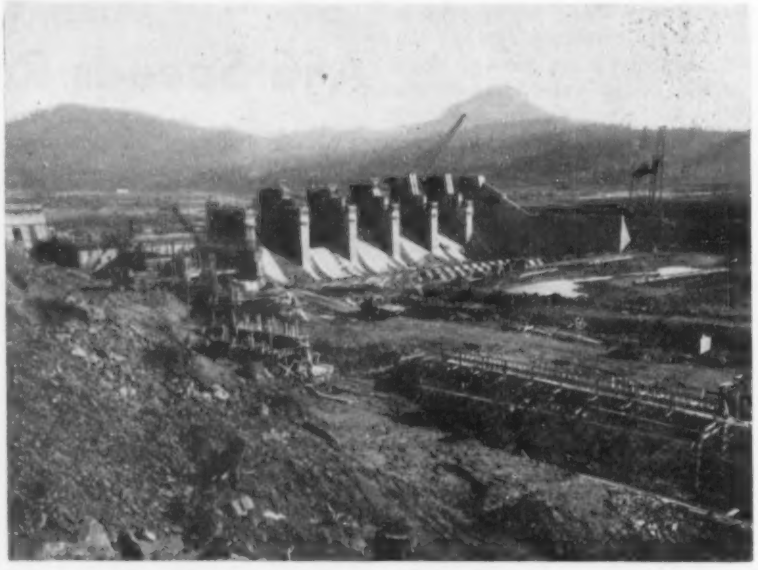
Proponents of public power development had their day before the Senate Public Works Committee last Monday and asked that Congress write a federal preference clause into any bill authorizing further power development at Niagara Falls.

Criticize Case Bill . . . Angus McDonald, representing the National Farmers Union, and Clyde T. Ellis, executive director of the National Rural Electric Cooperative Association, both criticized the Case Bill and New York Gov Thomas E. Dewey's plan for state development of Niagara power. Both spokesmen said their organizations favor the Lehman-Roosevelt bill, which calls for development by New York State but contains the kind of purchasing preference they want.

But they urged that if the Case bill is seriously considered by the Senate, it should be amended to require the Federal Power Commission to include a federal type preference clause in any license for Niagara construction and operations.

Ellis, in lashing out at the Case bill, said, "We object to the Case bill because we believe the Congress should specify the conditions under which this great undeveloped power site should be developed.

"Some say the Congress should not do this if the project is built with funds raised by the State of New York. This is a federal resource. It is a federal responsibility. The Fed-



Dexter Dam Nears Completion

Concrete work of the main spillway section, powerhouse substructure and portions of the fishways of the $12-million Dexter reregulating dam for Lookout Point project on Oregon's Willamette River is taking shape. Army Corps of Engineers reports the work is 70% complete.

In the view from downstream the powerhouse is taking form at left and fishways are visible in the foreground. The 359 ft long spillway section will be 90 ft high, which is also the height of the 2,250-ft long earthfill structure being created in the right background. Plans call for 15,000 kw of installed generating capacity.

eral Power Commission has already said in the St. Lawrence case that it does not have authority under the law to provide the people with this so-called federal preference law type of protection. We think it does have, but, in any case, the matter could be settled by this committee by writing such authority into whatever bills it approves."

Ellis also called for federally financed transmission lines at the Niagara site.

Calls for 'Yardstick' . . . McDonald backed up Ellis' arguments that the northeastern United States needs the "competitive yardstick" of low cost power that would be available to rural and public consumers under such a preference marketing plan. And he attacked what he called a "pattern" intended to reverse public power policy:

"We feel that legislation authorizing Niagara which does not contain the preference clause will be followed by similar bills affecting regions where we have substantial membership. Actually, the attempt of the utilities to reverse public power policy is evident in every fight revolving around legislation authorizing the building of hydroelectric and steam plant electric projects all over the United States. We see a pattern which has already developed in the Southwest power region, in the Southeast, in the Missouri valley, in the Northwest and in other areas where public power projects or public power sites exist."

Moses Scheduled to Appear . . . Robert Moses, chairman of New York State Power Authority, was scheduled to testify before the Public Works Committee as Electrical World went to press.

Still other witnesses are expected to be heard before a bill is reported to the Senate floor. Sen Wayne Morse (Ind-Ore.) said he was in no hurry to report out a bill. He called the Niagara bills "bellwethers," certain to set precedent on preference policy for the whole country.

Morse has reported requests to testify from at least three public power and union groups. He also requested —and the committee approved—that Ellis appear again and has asked Sen Herbert H. Lehman and Rep Franklin D. Roosevelt, Jr, New York Democrats, to appear for further questioning.

Effect of Niagara Court Ruling . . .

. . . on utilities' plan for redevelopment at falls discussed by Machold. Gatchell takes exception to statement in EW story

Niagara Mohawk Power Corp regards its victory in a Supreme Court case involving the company and the Federal Power Commission (EW, March 22, p 92) as strengthening its position in seeking, along with four other New York utilities, federal approval for development of additional power at Niagara Falls.

Machold's Statement

In a statement issued eight days after the March 15 court decision in the water rights case, Earle J. Machold, president of Niagara Mohawk, declared:

"The recent decision of the United States Supreme Court in Federal Power Commission vs Niagara Mohawk Power Corp upholds the company's position that its private property rights, valid under the law of New York, to use Niagara River waters for power purposes were not abolished by the Federal Power Act. Both the United States Court of Appeals and the Supreme Court held that, while the Federal Power Act was an exercise of supreme federal controls over navigable streams, the act reserves the right of local property owners. . . .

Bearing on Redevelopment Plan . . . "The company had been asked what bearing this decision has on the proposed redevelopment at Niagara Falls. The decision does not disturb the exclusive right of the Congress of the United States to control the issuance of a license for the use of the Niagara River waters for power purposes. That right has been exercised ever since 1906 and was last invoked by the Congress in the 1950 treaty with Canada. This federal jurisdiction has for many years precluded any pretentions of the state to a veto power over the exercise of federal control. In the Niagara Mohawk case, the Supreme Court stresses its decision in First Iowa Co-op vs Federal Power Commission decided in 1946 in which it ruled that under the Federal Power Act a state was powerless to prevent the federal government from exercising its paramount power to grant licenses to use navigable waters for power purposes.

"The company regards the decision as complete vindication of its private property and riparian rights along the Niagara River. It feels that this decision strengthens the position of the five New York electric companies in seeking federal approval for its redevelopment at Niagara Falls by private enterprise."

Misquoted Says Gatchell . . . In a related development, FPC General Counsel Willard Gatchell wrote Electrical World he had been misquoted in the news story on the court decision appearing in the March 22 issue.

The EW story, says Gatchell, quotes him as apparently looking upon the court decision as a sweeping setback for federal regulation over power development on navigable streams and as having said "such a view would have the effect of a 'state veto' over water power development."

Gatchell's Position

Gatchell pointed out that he made no statements to EW's Washington correspondent on the effect of the Supreme Court opinion. Further, he said, the quoted material is not part of any of his arguments on the case.

According to EW's Washington correspondent, Jesse Mock, the words 'state veto' were used in a paper prepared by Gatchell for use in oral argument before the U. S. Court of Appeals. At that time Gatchell said in part:

"Obviously, if state water power rights are required, they can be refused by a state and thus a federally authorized power development may be prevented as a matter of law. It is equally obvious that as a matter of economics a federally authorized power development may be rendered infeasible by excessive water power values justified by state law.

"Upon a state veto, a water power development which under the Federal Power Act could serve comprehensive national plans, becomes reserved for purely local purposes at the will of the state."

OFFICERS, SPEAKERS pictured at SEE's recent 21st annual conference at Boca Raton, Fla., are (left to right) John W. Talley, SEE managing director; Walter H. Sammis, president of both EEI and Ohio Edison; L. C. McClurkin, president of SEE and Savannah Electric & Power; Harllee Branch, Jr, SEE president-elect and president of Georgia Power; McGregor Smith, president, Florida Power & Light

Edison Electric Institute Pres Walter Sammis tells Southeastern Electric Exchange . . .

Let Service Dominate Your Thinking

The Southeastern Electric Exchange was told by Edison Electric Institute Pres W. H. Sammis that efficient, dependable service that is profitable to customers and companies must dominate utility's thinking and actions.

He addressed SEE's 21st annual conference, held March 22-24 at Boca Raton, Fla., and attended by a record 600 persons. Sammis urged the utilities to advise fully the public of the problems and inequities that exist in the continuing policy of Congress permitting government bureaus and agencies to compete unfairly in the power business and also how the public will be benefited by their fair and proper solution or elimination.

Big Customer Gain . . . SEE's retiring president L. C. McClurkin, president of Savannah Electric & Power Co, told the conference that SEE companies' increase in customers during the past five years has been at a rate 62% greater than the national experience. He stated additions to generating capacity were 33% above the growth rate industry-wide; energy sales advanced 10.2% faster than the national average; and the rate of increase in gross revenues was 19.3% greater than for the industry as a whole. This great expansion, McClurkin said, has been accomplished with the insignificant upward adjustment of only 1.93% in the average price per kwhr by the southeastern companies.

Gwilym A. Price, president of Westinghouse Electric Corp, urged the group to support the Capehart-Martin-Miller bill to permit Niagara Falls power development to be carried out by the investor-owned New York utilities rather than by a state authority. He said "Niagara Falls is more than 1,000 miles away, but this is just as much your fight as it is the fight of the New York utilities immediately concerned."

Ralph A. Tudor, Undersecretary of Interior Department, told the group that his agency proposes to recommend the construction of new transmission lines "only to the extent necessary to provide economically feasible interconnections between federally owned generating plants so that these plants may be operated to the best advantage."

"We do not believe that it is economically sound or justified for the federal government to duplicate facilities unless the terms demanded for wheeling or other services are unreasonable," he stated. There is no need for the federal government to undertake to supply the power needs of the country, Tudor said, since the investor-owned companies have amply demonstrated their ability to keep up with the phenomenally rapid growth

in demand. Tudor said that it is far more important that available capital be put into new plants rather than anticipating purchase of existing federal generating plants.

Favors A-Power Research . . . According to E. H. Dixon, president of Middle South Utilities, Inc, and chairman of Atomic Power Committee of EEI, there are many benefits derived from development of a practical nuclear power technology. They should provide sufficient incentive to encourage utilities and others to continue their sincere efforts toward perfecting processes for producing electricity from nuclear reactors, he said. Dixon pointed out that until appropriate experiments and research have been conducted on a sizable scale, utilities really have no way of knowing what reactor power costs will be or how they can be reduced. He favored a program under which development of nuclear power is integrated with work aimed at improving shorter-term objectives of lower-cost energy from conventional fuel sources.

George E. Whitwell, vice president of Philadelphia Electric Co, in describing the changing electric utility sales responsibilities, said that the four major changes in America today affecting these sales were:

- The greatest sellers market era has ended.
- The government policy is now one of economizing.
- Major plant expansion has halted.
- Inflation has stalled.

Whitwell recommended a 25-minute sound, slide film which has been shown to sales personnel in his company. The film, he said, is entitled "Future of America." It covers 17 changes in America and what they mean to sales.

Backs Residential Rate Hike . . . Residential rates should be increased, especially for the larger users with low load factor, and a demand principle should be included, according to Edwin Vennard, president, Middle West Service Co.

There are three avenues open for providing a load factor principle for large residential users:

1. Allow the bottom step to remain at the low level and add a demand charge beginning at about 5 kw.

2. Raise all bottom steps to a satisfactory level for low load factor and then provide a load factor discount beginning at about 5 kw.

3. Raise all bottom steps to a satisfactory level for low load factor and provide an optional demand type rate beginning at about 5 kw.

He said, however, a specific method would not apply in all cases due to differences in local conditions. The rate design should be patterned for the individual company.

In the opinion of Dexter M. Keezer, vice president and director of Economics Department, McGraw-Hill Publishing Co, business will drift slowly downward for some months. He said that when the turn in business comes, a "rousing speculative boom, probably though not necessarily centered in the stock market, will not be far behind."

In the opinion of Joseph Pope, vice president, Stone & Webster Engineering Corp, the advantage of geographic location will be lost when atomic power is used by utilities. Power in New England would cost no more than in Louisiana. He suggested that a number of small "package" generating stations might be placed strategically around a company's network.

At the close of the meeting, Harllee Branch, Jr, president of Georgia Power Co, was elected new president of the organization. Three new vice presidents were also elected. They are W. J. Clapp, president, Florida Power Corp, first vice president; George S. Dinwiddie, president, New Orleans Public Service Inc, second vice president; and L. M. Smith, president, Alabama Power Co, third vice president.

Cost Allocation Plan May Raise Rates

Interior Department has swung over to a cost allocation method that is expected to increase power rates for future projects of Interior agencies. But the new cost policy won't mean any sharp or sudden changes in the established power rates of existing or authorized projects.

The new policy will result in charging more construction costs to the power, irrigation, and other income-producing features of multipurpose dams. In essence, the procedure is the same that has been used in recent years by both the Army Corps of Engineers and Federal Power Commission. In nearly every case, it assigns a higher cost allocation to power than do the varied methods formerly applied by Interior agencies.

No Iron-Clad Rule . . . Interior officials have no intention of applying the uniform method blindly to projects under construction or authorized, for which final cost allocations have not yet been made. Neither do they intend to let the new method upset the rates for power from operating projects that have been under fire for faulty allocation of costs by Interior agencies.

All department decisions on matters affecting power rates are to be subject to the rule of reason, Interior officials have said repeatedly. Undersecretary Ralph Tudor, for example, has put the department's policy in a nutshell for Congressional committees by saying that Interior is not giving to price its product out of the market.

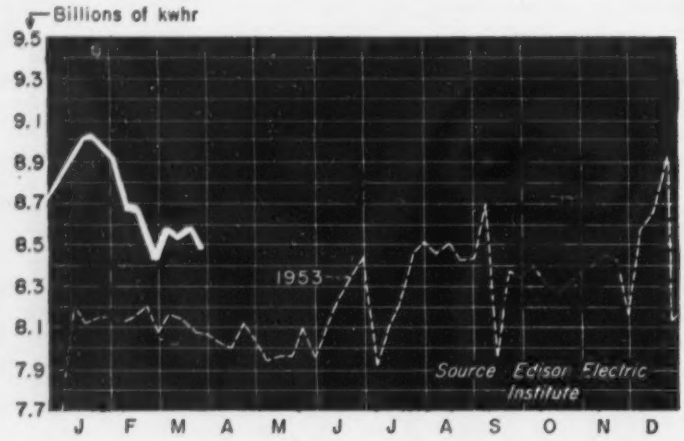
What that implies, Department people explain, is that no increase will be made in any established power rate without assurance that the change won't disturb or endanger the local economy or the financial health of the customers, public or private. However, adoption of the uniform formula does put a new floor under cost allocations by Interior agencies.

The New Procedure . . . Scheduled for most frequent use under the new procedure will be the so-called "reparable costs—remaining benefits" method. This method makes a marriage of two basic systems, using one as a check on the other.

What the method boils down to is this: First the identifiable, specific, separable costs for such things as power plants and switchyards are segregated from the total project. The remaining joint cost then is distributed, on a basis of reasonable alternate costs, among the purposes that are combined in the joint project.

These alternate costs are checked two ways, and the one chosen for use is the lesser of the two. One of these is the cost of an alternative, separate project to achieve the single purpose desired. The second is the value of the benefits to be derived from performance of the single function devoted by the purpose.

STATISTICS



Output Week Ended Mar. 27—8,491,000,000 Kwhr

Seasonally Adjusted Index†—162.6

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Mar. 27	+5.2	+0.8	+1.4	−2.0	+11.6	+18.2	+13.0	+3.4	+6.7	−2.2
Mar. 20	+6.1	+2.0	+1.8	−1.3	+11.8	+22.1	+9.0	+3.3	+7.0	+0.1
Mar. 13	+4.7	−0.2	+0.2	−3.0	+9.5	+17.7	+8.1	+5.9	+8.1	+2.9

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	Jan.	81.1	81.2	74.9
Capacity (Million Kw)	Jan.	91.68	91.49	82.38
Production (Billion Kwhr)	Jan.	39.42	39.06	36.66
Hydro	Jan.	8.90	8.67	9.26
Fuel	Jan.	30.52	30.39	27.40
Fuel Consumption				
Coal (Million Tons)	Jan.	10.92	10.87	10.49
Oil (Million Barrels)	Jan.	8.29	7.62	7.70
Gas (Billion Cu Ft)	Jan.	67.41	70.78	60.06
Sales (Billion Kwhr)	Dec.	32.31	31.59	31.20
Residential	Dec.	9.77	9.02	8.91
Commercial	Dec.	5.60	5.50	5.21
Industrial	Dec.	14.83	14.95	15.11
Other	Dec.	2.12	2.12	1.98
Net Income Class A & B Companies ($ Million)	Nov.	84.26	76.19	80.63
Estimated Dec. '54 Peak (Million Kw)	Dec.	94.0	94.7	96.0
Kwhr per Residential Customer (12 Month Average)	Dec.	2,345	2,331	2,169
Revenue per Kwhr Residential Service (12 Month Average)	Dec.	2.74¢	2.75¢	2.77¢
Canadian Production (Billion Kwhr)	Dec.	5.72	5.45	5.54

Business Statistics

FRB Industrial Production Index†	Feb.	125*	124	136
Gross National Production Annual Rate ($ Billion)	4th Qtr	363.5	369.5	361.1
EW 4 Industry Production Index†	Feb.	114.6	117.3	125.4
ENR Construction Cost Index††	Mar.	128.7	128.9	123.2
BLS Consumer's Price Index	Jan.	115.2	114.9	113.9
NEMA Insulation Materials Sales Index†	Jan.	124	133	174
NEMA Electric Appliance Sales Index†	Jan.	90	69	116
NEMA Household Refrig. Sales Index†	Jan.	95	53	93
Metal Prices (Mar. 30)				
Copper, Conn. V., lb		$.29¾	.29¾	.29-.30
Lead, N. Y., lb		.13½	.12½	.13½
Zinc, prime Western E. St. Louis, lb		.10¼	.09¼	.11
Tin, Straits, qual. N. Y. lb		.95½	.86¾	1.21¼
Aluminum, ingot, base price		.21½	.21½	.20½
Nickel, base price		.60	.60	.60
Steel, billets, Pitts., ton		62.00	62.00	59.00
Steel, scrap, No. 1 heavy, Pitts., ton		26.00	28.00	44.00

*Preliminary **Revised †1947-49=100 ††1949=100

Big IC, Bigger Steam and Biggest Hydro Plants

Nearly one-fourth of the total energy produced in 1952 was generated at 59 of the country's largest plants. Their total capacity was over 18 million kw, or about 22% of the total industry. The 20 largest steam plants (all over 400 Mw), accounted for 57% of the 18 million, while the 18 largest hydro (over 130 Mw) represented 42%, and the 21 largest internal combustion plants (over 9,000 kw), made up the remaining 1%.

Steam Plants		Capacity 000 Mw
Con Edison	Hudson Gold	941
	Waterside	658.2
	Hell Gate	630
Niagara Mohawk	Huntley	625
Con Edison	East River	576.5
TVA	Johnsonville	562.5
Pacific G & E	Moss Landing	528.5
Detroit Edison	Conners Creek	515
Central Operating	Philip Sporn	500
Detroit Edison	Trenton Channel	500
Commonwealth Ed	Fisk	473
Pub Serv E & G	Sewaren	455
Philadelphia E	Richmond	450
Commonwealth Ed	Crawford	424
Cleveland E I	Lake Shore	420
So Cal Edison	Long Beach	411.5
Ohio Power	Philo	409
Wisconsin E P	Port Washington	400
Union E P	Venice No. 2	400
Commonwealth Ed	Waukegan	400
Total		10,279.2

Hydro Plants		
Bur of Reclamation	Grand Coulee	1,954
	Hoover	1,245
Corps of Engineers	Bonneville	518.4
TVA	Wilson	436
Bur of Reclamation	Shasta	375
Niagara Mohawk	Schoellkopf	334.8
Corps of Engineers	Wolf Creek	270
TVA	Wheeler	259.2
Susquehanna E	Conowingo	252
Safe Harbor W P	Safe Harbor	230
Bureau of Reclamation	Davis	225
TVA	Pickwick Landing	216
	Kentucky	160
Alabama P	Martin Dam	154.2
TVA	Watts Bar	150
Conn River P	Comerford	140.4
TVA	Fontana	135
Corps of Engineers	Center Hill	135
Seattle	Gorge	134.4
S. C. Pub Serv	Pinopolis	132.6
S. C. E & G	Saluda	130
Total		7,587.0

Internal Combustion Plants		
So Cal Ed	Vernon City	30
Tucson GEL&P	Tucson	14.4
Lubbock	Lubbock	14.15
Denton WL & S	Denton	12.26
Imperial I D	Brawley	12
Freeport	Freeport	11.6
Ponca City W & L	Ponca City	11.28
Carthage W & E	Carthage	11.06
Minnkota P Coop	Grand Forks	10.84
Rockville Center	Rockville Ctr.	10.42
Dairyland P Coop	Twin Lakes	10.4
Wolverine P Coop	Johnson	10.15
Cliffs P & L	Ishpeming	10
Iowa E L & P	Marshalltown	10
Salt River Project	Tempe	10
Grand Haven	Grand Haven	9.43
M. A. E P Coop	Poplar Bluff	9.40
Lake Worth L & W	Lake Worth	9.1
Total		216.48

Source: Federal Power Commission—33rd Annual Report

FINANCIAL

Appliance Tax . . .

. . . on electric, gas and oil gadgets is reduced from 10% to 5% by a 64-23 Senate vote

Relief for the electrical appliance was provided in the excise bill approved recently in the Senate by a 64-23 vote. The tax on household appliances, which the House had refused to reduce from the 10% level, was cut in half by the Senate action.

Senate Adds $122-Million Cut . . . Relief came as the Senate added $122 million in tax cuts to the House-passed bill which provided for only $912 million. At the same time, the bill continued for one year some $1,077 million in excise taxes on such items as whiskey, tobacco, gasoline, autos, trucks, and parts, and sporting goods. The tax on these items was scheduled to have dropped to the pre-Korea level on April 1.

The appliance tax cut came after Sen Paul Douglas (D-Ill.) had sought to remove the tax completely on all electric, gas, and oil appliances. Sen Homer Capehart (R-Ind.) got Republican support for the move when he softened the Douglas proposal by cutting the tax to only 5%. He said he had been flooded with wires and phone calls from Indiana constitutents seeking relief on behalf of the appliance industry.

Sen Capehart said that Indiana is the largest manufacturer of refrigerators and other durable goods affected by the amendment and said that he had complaints of considerable unemployment in the industry. "Ten per cent on a $500 refrigerator is $50," he pointed out. "If it is a fact there is a good deal of unemployment in the durable goods industry, we ought to take a good look at this matter."

Inequities . . . Sen Capehart pointed to what he called the inequity of reducing the tax on luxury items from 20% to 10%, while no reduction was made in household appliances. (Three appliances are exempt from excise taxes: washing machines, vacuum cleaners, and sewing machines.)

"I am not certain I agree with the

(*Continued on page* 192)

Today in Utility Finance

YIELDS (%)

Quality	Bonds 1st	Bonds 2nd	Bonds 3rd	Preferred Stocks 1st	Preferred Stocks 2nd	Preferred Stocks 3rd	Common Stocks 1st	Common Stocks 2nd	Common Stocks 3rd
DATE 1954									
Mar. 25	**2.82**	**2.87**	**3.14**	**3.88**	**4.09**	**4.42**	**4.83**	**5.19**	**5.42**
Mar. 18	2.82	2.84	3.15	3.90	4.11	4.44	4.79	5.17	5.43
END OF QTR.									
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.97	6.01
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10
1st 1953	3.15	3.23	3.39	4.16	4.41	4.66	4.95	5.24	5.50

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
American Gas & Electric, consolidated	12	Dec.	$26,660,853	$22,488,514	$2.14(a)	$1.94(a)
Arizona Public Service	12	Dec.	3,798,000	3,319,000	1.24(b)	1.38(b)
Delaware Power & Light	12	Dec.	4,207,608	3,601,542	1.84(c)	1.75(c)
Duquesne Light	12	Dec.	15,309,554	14,041,399	2.22(f)	2.10(f)
Kansas City Power & Light	12	Dec.	6,521,293	5,978,438	2.42	2.19
Northern Indiana Public Service	12	Dec.	9,124,701	8,471,523	2.40(g)	2.33(g)
Pacific Gas & Electric	12	Dec.	59,603,395	47,000,250	3.12(h)	2.52(h)
Potomac Electric Power	12	Dec.	6,304,475	6,165,942	1.15(i)	1.35(i)
Public Service of Colorado	12	Dec.	7,854,369	7,225,654	2.34(j)	2.20(j)
West Penn Electric, consolidated	12	Dec.	14,490,232	13,487,366	3.43(k)	3.40(k)

Notes—Figures shown for the ten companies have been audited; (a) Based on 12,439,748 shares in 1953 and 11,577,020 shares in 1952; (b) Based on 2,640,000 shares in 1953 and 2,022,000 shares in 1952; (c) Based on 1,858,228 shares in 1953 and 1,627,640 shares 1952; (f) Based on 6,150,000 shares in 1953 and 6,000,000 shares in 1952; (g) Based on 3,158,987 shares in 1953 and 3,094,013 shares in 1952; (h) Based on 14,114,427 shares in 1953 and 12,492,070 shares in 1952; (i) Based on 5,117,040 shares in 1953 and 4,264,200 shares in 1952; (j) Based on 2,754,639 shares in 1953 and 2,750,976 shares in 1952; (k) Based on 4,224,000 shares in 1953 and 3,960,000 shares in 1952.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF MARCH 25-31			
Bonds			
Pacific Power & Light—1st mtg 3¼% due 1984	$8,000	101.80%	3.28%
San Diego Gas & Electric—1st mtg 2⅛% due 1984	17,000	98.90	2.93
Common Stock			
Central Louisiana Electric—12,720 sh (a)	280	$22.00	4.55%
SCHEDULE FOR APRIL—MAY			**Bid Date**
Bonds and Debentures			
Georgia Power—1st mtg due 1984	$11,000	.....	April 6
Community Public Service—1st mtg due 1984	3,000	.....	April 6
Central Power & Light—1st mtg due 1984	18,000	.....	April 12
Southern Indiana Gas & Electric—1st mtg due 1984	8,000	.....	April 13
Ohio Power—1st mtg	20,000	.....	April 14
Los Angeles Department of Water & Power—electric plant revenues due 1955-84	15,000	.....	April 14
West Penn Power—1st mtg due 1984	12,000	.....	April 20
Delaware Power & Light—1st mtg	10,000	.....	April 27
Utah Power & Light—1st mtg due 1984	15,000	.....	April 28
Montana Power—1st mtg due 1984	6,000	.....	May 4
Cleveland Electric Illuminating—1st mtg due 1989	20,000	.....	May 6
Montana Power—debs due 1979	18,000	.....	May 12
Consolidated Edison Co. of N. Y.—1st mtg due 1984	50,000	.....	May 11
Virginia Electric & Power—1st mtg due 1984	25,000	.....	May 17
Public Service Electric & Gas—1st mtg due 1984	50,000	.....	May 26
Preferred Stock			
West Texas Utilities—60,000 sh cum $100 par	$6,000	.....	April 8
Ohio Power—50,000 sh $50 par	2,500	.....	April 14
Northern States Power (Minn.)—150,000 sh $100 par	15,000	.....	April 20
Arkansas Power & Light—70,000 sh $100 par	7,000	.....	April 20
Montana Power—60,000 sh $100 par	6,000	.....	May 4
Common Stock			
Public Service Co of New Mexico—138,551 shares (to be offered commonholders on 1-for-10 basis, record April 1 to expire about April 15)	.....	.....	.....
Pennsylvania Power & Light—704,917 shares (to be offered commonholders on a 1-for-7 basis, record April 2 to expire April 19)	.....	.....	.....
Texas Utilities—250,000 sh	.....	.....	April 13
Northern States Power (Minn.)—1,219,856 sh (to be offered commonholders on 1-for-10 basis, record April 15 to expire May 4)	.....	.....	April 14

Notes—(a) Company is offering the stock to residents of its service area by employees who get a commission of 50¢ a share.

WASHINGTON COMMENT

JESSE MOCK

Suppose for a moment that electric utilities—public and private—sought to base an appliance promotion campaign entirely on the load-building effect it would have on the utility.

Take a further fanciful jump and suppose the appliance distributor and retailer were content to let the utility campaign replace all consumer-directed advertising. This might possibly educate a few people in utility economics—certainly a commendable task. But it wouldn't sell many electric stoves or water heaters.

Republicans must merchandise their power policy

With this preposterous supposition in mind, take a look at Republican federal power policy and the way it is being explained to the American people:

- The Administration believes hydroelectric projects should pay their own way.
- The government plans to use non-federal transmission lines wherever they are or can be made available.
- Local interests are being given a bigger role in water-power development.
- Federal power marketing policies are to be administered to maintain current marketing patterns in the federal project areas.

These objectives sound fair and reasonable to many electric company officials and to others well acquainted with utility operations. If government officials were dealing exclusively with utility men, they might eventually win even the rock-ribbed public power men over to their side.

But all this is utility economics—the same kind of stuff that made up the mythical promotion campaign for selling electrical appliances. It didn't sell many stoves, and some Administration men are worried that it isn't selling the Republican power policy.

Selling Job to Be Done . . . Some of those who are worried about getting the GOP viewpoint over to the general public are the very ones who helped to formulate it and now have a hand in administering it. They are frankly worried about the effect which the policy may have on the elections this fall, and they can't quite understand why it doesn't appeal to a large segment of the voters.

But a look at most of the policy documents, including the speeches of government power officials, indicates a producer's point of view, rather than a consumer's point of view. This is pretty much true from the comprehensive Interior power policy issued last August to the Georgia contract proposal announced in February.

There has not been much disposition by government officials to translate these policies into consumer terms. Utility men, of course, are able to do this for themselves. But to others terms like "load factor," "self-sustaining power projects," "utility responsibility," and "federal domination" are no great cause for concern or even understanding.

Public Power Slant . . . Where administration men have failed to supply their own interpretation of the new policies, public power advocates have freely offered their own slanted versions. You get these in numerous magazines and a few daily newspapers.

For instance, the goal of self-sustaining power projects is interpreted to mean that government power rates are going up—not that federal power users are going to pay their fair share of production costs.

Greater use of existing transmission lines is interpreted to mean that the government is abdicating its responsibilities—not that it is saving money and may be able to keep rates lower.

You can get much the same slanted interpretation right down the list.

The public power crusaders have a sizeable advantage just because they are putting the policy in consumer terms—accurate or not—rather than in utility or producer terms.

Administration men sincerely believe they have evolved fair and reasonable power policies—much fairer than were in effect during the previous 20 years.

They still have the job of selling this policy on terms that consumers can understand.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Incremental rate near full load on new equipment may not be as high as incremental rate at relatively light load on older equipment. In this case assignment of control to the new equipment may entail some loss to the system.

Sulfur hexafluoride at 3 atmospheres has a dielectric strength about equal to 10C transformer oil.

Breaker switching a capacitor bank with no parallel bank operates without restrike if the short-circuit capacity of the power source is below a critical value determined by the size of the capacitor.

Inlet steam temperatures have increased 50 degrees every four years, ie from 500 F in 1904 to 1,100 F in 1953.

Bundled conductors have higher current capacity and charging current than single conductors but lower reactance and corona losses.

Nuclear energy can conceivably be a by-product of the fertilizer industry now that uranium is being extracted from phosphate rock.

Anode for protection of cable sheath against corrosion will consist of 2x18-in. graphite rods attached at 5-ft intervals to an insulated wire drawn into a spare duct.

Single cylinder condensing turbines were, until 1930, limited to 10,000 kw in the 3,600 rpm speeds. The largest now being built are also 3,600 rpm—typifying 23 years of progress.

Zirconium, a rarity 5 years ago, is better known now as to its properties and potentialities than are many metals used for decades.

Rubber insulation does not adhere naturally to aluminum conductors—an adhesive agent must be used. Nor is aluminum affected adversely by the sulfur used in vulcanization of rubber.

To Promote

Light's Diamond Jubilee

Electrical World

Quotes C. E. Wilson on the nation's electrical progress celebrated by the Jubilee

Pictures annual Edison anniversary at Fort Myers

Presents the national organization for the Jubilee

Quotes W. H. Sammis, EEI president on the power companies' interest in the Jubilee

Reports on power company plans for local Jubilee activities

Offers a sketchbook of Jubilee ideas to stir imagination

INTERVIEW WITH

'This man has developed out of this one single

Charles E. Wilson, former president of General Electric Co, former Director of Defense Mobilization, is serving as chairman of Light's Diamond Jubilee Sponsoring Committee. Here, in a Question-and-Answer session with EW editors, he tells how he feels about the electrical industry's development over the last 75 years.

Q. *Mr. Wilson, since Edison invented the incandescent lamp, in what areas has the electrical industry made the most progress?*

A. I think there's been across-the-board progress—first of all in generation at a cost that made electricity universally available. This went hand-in-hand with the development of industry. The industrial age only set in

A. The holding companies contributed substantially to the growth of the electric industry. Highly imaginative and courageous people went in and invested millions of dollars to string lines. Nobody can say that wasn't a good job for America.

Q. *Looking toward the future, Mr. Wilson . . . How do you think atomic energy will affect the power industry in the long run?*

A. I believe the next 20 years will see developments in the use of atomic energy for power generation that will obsolete many of the present methods. You'll have a whole new electrical world to look at in the generation field at Light's Centenary.

Q. *Some time ago you proposed that the people, as stockholders in power companies, buy up the country's federal power facilities. Do you foresee a time when the power industry will be entirely in the hands of private enterprise?*

A. I believe it will come about. I think the people of the U. S. are fed up with government competition with private industry. The private enterprise system made this the richest country in the world. The people will realize that. The great electric utilities have set such a pattern for success that nobody in his right mind could discount the fact that if they bought up the government projects that they'd make a success of them.

Q. *Well, do you feel the present Republican Administration is taking steps that will help make that possible, in the long run?*

A. I think this is a great Administration. And if they are given the time, I think they will come to selling the public power projects to private enterprise.

Q. *What do you think the industry's goal should be?*

A. Not long ago I was abroad and had to drive for some 300 miles through the countryside. When it grew dark I noticed that we were driving through towns and villages in which there were almost no lights. Then I realized what I had been missing all afternoon—we had been driving through a country that was virtually without benefit of electricity.

I have spent most of my life in the electrical industry. Yet I think that one drive brought home to me—more forcefully than anything had ever done before—what I and everyone else had been working for. We were working

CHARLIE WILSON:

Edison—It amazes me when I think what invention'

because of the coming of the electrical age. You had to have industrial load to make possible cheap electric power for everyone.

The alternating current motor was a large contributor to that—it was the first attempt to increase man's muscle power electrically.

Q. *What areas would you say were most in need of improvement?*

A. I wouldn't know where the industry could stand improvement—I just wouldn't know.

Q. *At one time you were active in appliance production and sales. Would you say that selling is still the main part of the job ahead for the power industry?*

A. The power industry *is* doing a selling job—doing a wonderful job of selling "living electrically." We've an American genius for developing new things for the home to use electricity and selling them to the people. I think one of the things that made America great was this spirit of "keeping up with the Joneses." That had a lot to do with growth—when one family on the block got electricity, the rest had to have it.

In my own house in Scarsdale—I have an electric kitchen, my family and servants sleep under electric blankets. Even when they go to bed at night they're comforted by electricity.

And the next great thing is the heat pump—that will take care of a family's physical comfort winter and summer.

Q. *Do you think the profit motive was the principle factor in bringing the industry to its present state of development?*

A. Yes—It was the idea of free enterprise that made us progress far, far faster than England and countries like that have under municipal and government power. I spoke at a factory in England in 1948 and I asked how many of them had electric refrigerators. It turned out to be almost none. And when I told them 90% of the people in America have electric refrigerators, they just sat there unbelieving.

Q. *And what about the holding companies, how did they stack up in developing power?*

to help this country progress through electricity.

We can't take the American people on a drive like that one. But Light's Diamond Jubilee gives our industry a chance to do much the same thing—to show what 75 years of electrical progress has meant to their lives.

Q. *Can you give us your idea of what the power industry will be like, what challenges it will have to face 25 years from now on the 100th anniversary of Edison's lamp?*

A. By 1979, this country will more than doubled its power production, and electrical living, with all that it gives, will have increased greatly. Over all use of electricity will triple.

The people in the electrical industry have a great product—and they're wise enough and have vision enough to peddle that product. They've got a good road to go down.

JOHN EDISON SLOANE used to fish with his famous grandfather from the end of this pier on the Edison Estate at Ft. Myers, Fla.

A return to light's beginning:

Edison's Grandson Revisits Inventor's

Thomas Alva Edison came to Florida in 1884 in search of bamboo. He'd been experimenting with charred fibers of the plant as an improvement on the carbonized cotton filament he had used in his first successful incandescent lamp five years before.

Along the south bank of the Caloosahatchee near the small town of Ft. Myers he found what he'd been looking for—towering clumps of bamboo of a species exactly suited to his purpose. He bought a tract of it, put up two huge tropical houses and a laboratory. There, with his second wife, Mina Miller, he spent his winters until his death in 1931.

Edison's children and grandchildren lived and visited with him at Ft. Myers over the years. One of them—grandson John Edison Sloane—returned this year on the 107th anniversary of the inventor's birth to help pay homage. The occasion was the city's 13th Annual Edison Pageant of Light—which this year took as its theme Light's Diamond Jubilee. Sloane crowned a King and Queen of Edisonia, as his grandmother and later his uncle, former Gov Charles Edison of New Jersey, had done before him.

To the people of Ft. Myers, Edison and his family remain the town's first citizens—during the Pageant the name was mentioned everywhere. "Didn't Ford and Firestone build homes near his so they could spend their winters together?" (They did.) "Is it true he finished work on his bulb here?" (Not precisely—he improved it here. Bamboo filaments were used until the advent of tungsten.) There are myriad reminders of the man: Edison High School, Edison Cafeteria; at the edge of town a new development called Edison Acres.

The week of his birthday (Feb. 11) the place was drenched in Edisonia. All over town bunting was flying to proclaim that this was the Edison Pageant and this year was Light's Diamond Jubilee. Edison's picture, memorabilia, displays of his early electrical inventions crowded store windows.

At Florida Power & Light Co's division office, Division Manager J. L. Sanders set up an illuminated display tracing the development of light from the early beginnings up to Edison's invention. Sanders himself was grand marshall of this year's "Light" parade. He recruited teen-age daughters of the division's employees to ride Florida P&L's float in the Pageant.

Before the week-long festivities began, John Edison Sloane went back to the Edison Estate, where in his youth he'd spent four vacation periods with The Man. "We

EDISON PAGEANT OF LIGHT this year featured Diamond Jubilee. Above, Sloane crowns "Queen of Edisonia" in ceremony honoring inventor

Florida Retreat, Joins in Jubilee Fete

called him Papa," he said as he walked along the tropical path that led to a long pier behind the house. "He'd get up early in the morning, work an eight-hour day in his laboratory, and then come down here to go fishing in the late afternoons. I used to go all the way out and fish with him. We kids made too much noise to suit him, though—we had to fish 10 yards away from where he was sitting."

Sloane, who is director of public relations of Thomas A. Edison, Inc, in West Orange, N. J., said his grandfather conducted development work in his West Orange laboratories by remote control from Ft. Myers. He'd spend his winters on the estate, reading and experimenting in the small lab there. Then, when he'd hit on something he wanted checked by organized research (which, incidentally, he was the first to develop), he'd tell the men in charge of the New Jersey plant to follow it up.

"Coming down here was as close as he ever got to a vacation," he said. "And when he was hot on an experiment, he'd hardly sleep at all. He'd take catnaps on the bench while some process simmered, or on the cot he always kept in the lab. My grandmother wouldn't see him for days except when she brought sandwiches down to him."

Edison's wife deeded the home and laboratory to the City of Ft. Myers shortly before her death in 1947. She had been interested in the Edison Pageant since it was started in 1938, and wanted the Estate to be kept up as a memorial to her husband. Sloane hopes the Edison Foundation, which the family set up in 1946, will someday take over the Ft. Myers estate. Right now the Foundation operates the original West Orange laboratory as a museum, but doesn't have the necessary funds.

"But it needs to be supported," he said, "so the Edison relics, laboratories, homes and so forth can be preserved. Maybe that will happen by Light's Centenary—I hope so."

In the spirit of Edison . . .

. . . a direct descendant, an entire city take part in a pageant

SLOANE shows wife Jule tungsten bulbs in use since his visits in 20's

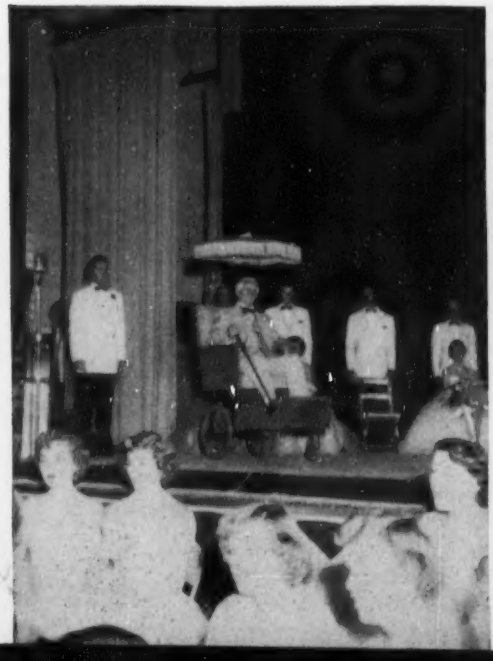
BAMBOO like this attracted Edison to estate, Curator Bob Halgrim tells Sloane on tour of grounds

IN LAB where Edison worked, Sloane operates display of lamps his grandfather pioneered

FLOATS such as this symbolized Light's Diamond Jubilee in a parade that climaxed Edison Pageant at Light at Ft. Myers

honoring the man and his most famous invention

AFTER VISITING estate, Sloane crowned King and Queen of Edisonia in stage show. Local resident portrayed inventor



EDISON PARTY received salute from guard of honor as they entered stadium where Pageant's parade ended. Outdoor show wound up festival

WALTER SAMMIS is both a power company president and head of EEI. In this interview he thinks out loud on . . .

What Light's

Q. *Mr. Sammis, why is the electric industry staging Light's Diamond Jubilee?*

A. First of all we're doing it to honor Edison. His invention brought comfort to the home, production to industry, and to our people the highest standard of living the world has ever known.

Next—and this is important—we're doing it to tell the American people what a job the electric industry has done for them since Edison first produced his lamp and the electric system to go with it.

Q. *How does the present celebration compare with Light's Golden Jubilee, 25 years ago?*

A. Oh, I think the electric people are much more enthusiastic about it today. They've already pledged nearly a million dollars for a super television show on Oct. 24 to tell the industry's story. And they're working up other good promotions, in about 800 communities . . . . In fact, the utilities are much more aggressive today in telling their story to the public. The public should be informed of more of the power industry's many accomplishments.

And that's what we're trying to do—through newspaper and magazine stories and advertising, radio, television and film showings. There's much that can be done to keep the Jubilee in the public eye.

Q. *Could you enumerate some of the achievements?*

A. Certainly. The electric industry has given the American people more comfort, more labor saving devices, better health and better entertainment than in any other country. What's the figure on television sets? Around 30 million, I believe. By impressing on the public these and many other contributions of electric service to our national progress, the Jubilee will give a great lift to our folks in the industry.

Q. *Ohio Edison, like many others, probably devotes much time to telling the industry's story to youth?*

A. Yes, it does. And we think that kind of activity is very important. The Jubilee will help us a lot in it. It will give us much that can be used to fire the imaginations of young people, to make them conscious of the accomplishments and the potentialities of our business, to enlist their interest and to attract some of them to seek a livelihood in our industry.

Diamond Jubilee Means to the Industry

Q. *What would Mr. Edison, were he here today, think of the growth in the uses of electricity that has followed his invention?*

A. He would scarcely believe it. He said at Light's Golden Jubilee that he never dreamed that from his invention would come "the stupendous electrical industry of today." Since that occasion, only 25 years ago, the use of electricity has multipled five times.

Q. *What about the industry's future, how does that look to you?*

A. It's just going to get bigger and better all the time. Look how it's expanded since Edison—the 50 millionth customer came on the line this year. And later this year, the 100 millionth kilowatt will come on the line. I think the industry has a wonderful future—and Light's Diamond Jubilee is an excellent way to tell about it.

RALPH P. WAGNER, Chairman, Electric Utilities Program Committee

W. H. ROBINSON, Jr, Chairman, Electrical Manufacturers Jubilee Committee

Although the Light's Diamond Jubilee D-Day, Oct. 21st, is some seven months away, national and local developments in the anniversary celebration are already making the United States jubilee-conscious.

Over 200 companies, groups, and organizations in the electrical industry have thus far joined in planning for jubilee observances, and the total continues to climb. Interest is not only nationwide—it extends beyond our borders to Canada, Hawaii, and to other areas as diverse as Ireland and South Africa.

Taking the lead in jubilee planning is an organization of four committees representing a wide range of electrical industry interest.

Foremost of these is the Sponsoring Committee for Light's Diamond Jubilee, a group of 38 distinguished Americans, headed by Charles E. Wilson, formerly president of General Electric Co. Among them are Herbert Hoover, Charles Edison, Harvey S. Firestone, Jr, and Henry Ford II, representing four great names closely associated during Thomas Edison's lifetime. Outstanding leaders who have made their careers in electric utilities, manufacturing companies, or in other electrical industry groups form the majority of the committee.

The jubilee's executive body is Light's Diamond Jubilee Committee, headed by Donald C. Luce, president of Public Service Electric & Gas Co. Responsible for specific phases are the Electric Utilities Program Committee, with Ralph P. Wagner, commercial manager of Niagara Mohawk Power Corp, as chairman; and the Electrical Manufacturers Jubilee Committee, whose chairman is W. H. Robinson, Jr, advertising manager of General Electric's Lamp Division.

Work of the various committees, of the agency, N. W. Ayer & Son, Inc; and of the committee secretary and coordinator has been concentrated on the development of Jubilee materials and information, national events and publicity, and, in general, on the stimulation of interest in the jubilee wherever possible.

But the most important work is being done in the communities across the nation where preparations are under way for local observances. The jubilee emblem and its slogan, "LIGHT FOR FREEDOM—POWER FOR PROGRESS", are already becoming familiar in many areas, through use in newspapers, television, company magazines, and special promotions of various kinds.

"Jubilee Communities" now number nearly 800, in 47 states and the District of Columbia. Spearheading plans in these cities and towns are some 175 electric companies, with over 37 million customers representing over 95% of the United States electric company customer total.

Jubilee Organization Covers Nation

In little more than a year, Light's Diamond's Jubilee was transferred from a nebulous idea into a going project in which over 200 companies and groups of the industry are participating with increasing enthusiasm.

Because the advances being celebrated by the jubilee are so far-reaching, the observances themselves call for the widest community participation. All electrical industry groups have a stake in the jubilee—whether they are utilities, manufacturers, wholesalers, retailers, engineering, or other professional groups. The jubilee is for everyone who has contributed to electrical progress and made it a way of life for himself and for his neighbors.

By keying the year's advertising and publicity activities to the jubilee, by tying in the theme with opportunities as they present themselves, electric companies and others can derive benefits from the jubilee and contribute to its overall impact with little extra expense.

Timely, Healthful Influence

Coming at a time when maintaining a high level of economic activity is of concern to many Americans, the jubilee can have a good influence on the business picture of the entire nation. There has never been a better opportunity to bring home to the American people the extraordinary advances which have come about as results of Thomas Edison's development of a practical incandescent lamp and a practical electricity supply system to light it on a mass basis.

The jubilee should provide better understanding and appreciation on the part of those to whom electricity has become as familiar and perhaps as unnoticed as the air they breathe:

Understanding and appreciation—of the people and organizations whose work is electrical progress: of the vast and growing number of ways in which electricity can serve; and of the hallmarks of individual initiative and economic freedom on all that has been done and is to do.

Community activities which will achieve this are as varied as the communities themselves. In many areas the jubilee is gaining the interest and cooperation of civic and business groups, schools, libraries, museums, and others not directly associated with the electrical industry.

Advertising, publicity, displays, special lighting, exhibits, tie-ins with other community anniversaries or activities, radio and television programs, scholarships, speeches, special promotions, or anniversary dinners—all these and many others offer jubilee opportunities for widespread community participation. The jubilee, like the electrical progress it celebrates, should reach everyone.

To climax the jubilee, both nationally and locally, is the two-hour, three-network television show. Television epitomizes modern electrical progress. It has been welcomed into millions of homes across the country as one of the family. And its ability to reach so many millions of Americans at once, with a single program, gives it true national impact.

The television show is the national backdrop against which just about every local jubilee observance can play. It will be produced by David O. Selznick, on Sunday, Oct. 24, and is planned as the greatest television event of the year. In it the best of name talent will present the story of electrical progress and what it means—in terms which will stimulate interest and understanding.

A special kit of materials on the television show will be distributed in late summer. It will include photographs and information on the show's production, content, and talent for local use in advertising, publicity, and promotion of this oustanding industry event.

Another of the Committee's major projects is a 16-mm motion picture, to be filmed in color, and running about 27 minutes. Producing the film is RKO-Pathe, who also plan to produce at the same time a 35-mm film on electrical progress in the "This is America" series for regular theatrical release.

The jubilee film will emphasize electrical achievement and prospects for future progress, treating the jubilee itself as a milestone, so that the useful life of the film will not be confined to the anniversary year. Prints of the film are to be available by late summer at a price to be determined.

As an opening jubilee event in their communities, some 40 electric companies took part in the committee's 50-millionth customer activity, connecting "possible" 50-millionth customers on Jan. 28. Newspapers throughout the nation devoted space to this industry milestone, and it was recognized in many localities on radio and television as well. Associated Press and United Press both carried wire stories on the event which were widely used.

Ice Capades of 1954 offers a Jubilee opportunity in the cities where it plays. Its opening number, "Diamond Jubilee of Light", was featured as a color story in LIFE. A number of companies and industry groups have held special "nights" at these performances.

This is only the beginning—a beginning which actually started over a year ago, when the EEI Board of Directors asked a group of six leading electrical industry executives to develop a jubilee program which could form the basis for participation by the entire industry.

The committee consisted of George H. Blake, then president of Public Service Electric & Gas Co, as chairman; Ralph J. Cordiner, president, General Electric Co; B. L. England, president, Atlantic City Electric Co, and then president of Edison Electric Institute; P. H. Powers, president, West Penn Power Co; Gwilym A. Price, president, Westinghouse Electric Corp; and Justin R. Whiting, chairman, Consumers Power Co, and then president, Association of Edison Illuminating Companies.

Under their guidance, the present committee structure took shape, and the planning and organization of Light's Diamond Jubilee began.

Widespread Industry Participation

The concept of the celebration is as broad as the scope of electrical achievement itself and includes the entire electrical industry. Any organization interested in planning jubilee activities can obtain information, materials, and other assistance from the headquarters of the Jubilee Committee.

Much thought and careful consideration by the committees and other groups, ranging in interest from the Public Utilities Advertising Association to the Illuminating Engineering Society, went into the development of the jubilee plan.

In mid-1953, an outline of the plan went to the industry, a questionnaire asking which communities jubilee activities might take place, what materials might be useful, and to whom further jubilee information should be directed.

The response was impressive. By the time of the first jubilee NEWSLETTER in early fall, it was possible to report that over 100 electric companies were planning activi-

ties. Now the company total is nearly doubled, and their customers represent about 95% of all company customers.

Through the electrical industry press, through the jubilee NEWSLETTER, and through special mailings of bulletins and memorandums, jubilee participants are being kept informed of progress in planning, materials development, and other activities.

On Edison's Birthday, Feb. 11, the two basic books of the jubilee were published.

The 32-page PLAN BOOK contains information on jubilee plans and materials as well as suggestions for developing local activities. The 96-page FACT BOOK is designed to furnish general information about electrical progress which should be helpful to anyone concerned with the jubilee story of achievement.

Much Material Obtainable

Also available for purchase from the jubilee committee at this time are various materials used on the emblem and slogan—bronze medallions, letterhead and window stickers, photographs, reproduction proofs, and postmark ad plates.

Other items—booklet, pass-out literature, streamer, photograph set, TV film spots, and a transcribed radio program—will become available in the next few months.

These committee materials are listed in the PLAN BOOK, along with materials available from other sources which range from souvenir items to parade floats.

As a running supplement to the PLAN BOOK and as a forum for Jubilee ideas and information, the NEWSLETTER is being published at least once a month until the jubilee is concluded. New materials and their sources are listed as they become available.

Jubilee events, activities, plans, and projects originating in every area of the nation are noted in the NEWSLETTER, not only to give recognition where it is due but also to stimulate the thinking of others working on programs.

Jubilee participants also receive on a regular basis suggested stories for company magazines and short speeches which may be adapted for a variety of uses.

In addition, special NEWSLETTER bulletins, publicity memoranda, and other mimeographed items are sent out when the information they provide may be helpful to local participants in taking advantage of special situations.

These are a few of the materials, means, and methods for use in telling the jubilee story. As the plans of Jubilee participants move towards the celebration's "peak period" in October, more opportunities will present themselves, both locally and nationally.

To help tell the story within the industry itself and to stimulate interest generally, the jubilee is being featured at major industry meetings, such as the recent American Power Conference, the EEI Sales Conference now opening in Chicago, and the EEI Annual Convention at Atlantic City in June.

Regional meetings of electrical industry associations and of engineering and other professional groups are including jubilee presentations on their programs.

The Jubilee an Opportunity

These are calls to action. The goal is realization on the part of all Americans of the jubilee's significance and of the meaning of electrical progress to them as individuals, to their communities, and to their nation.

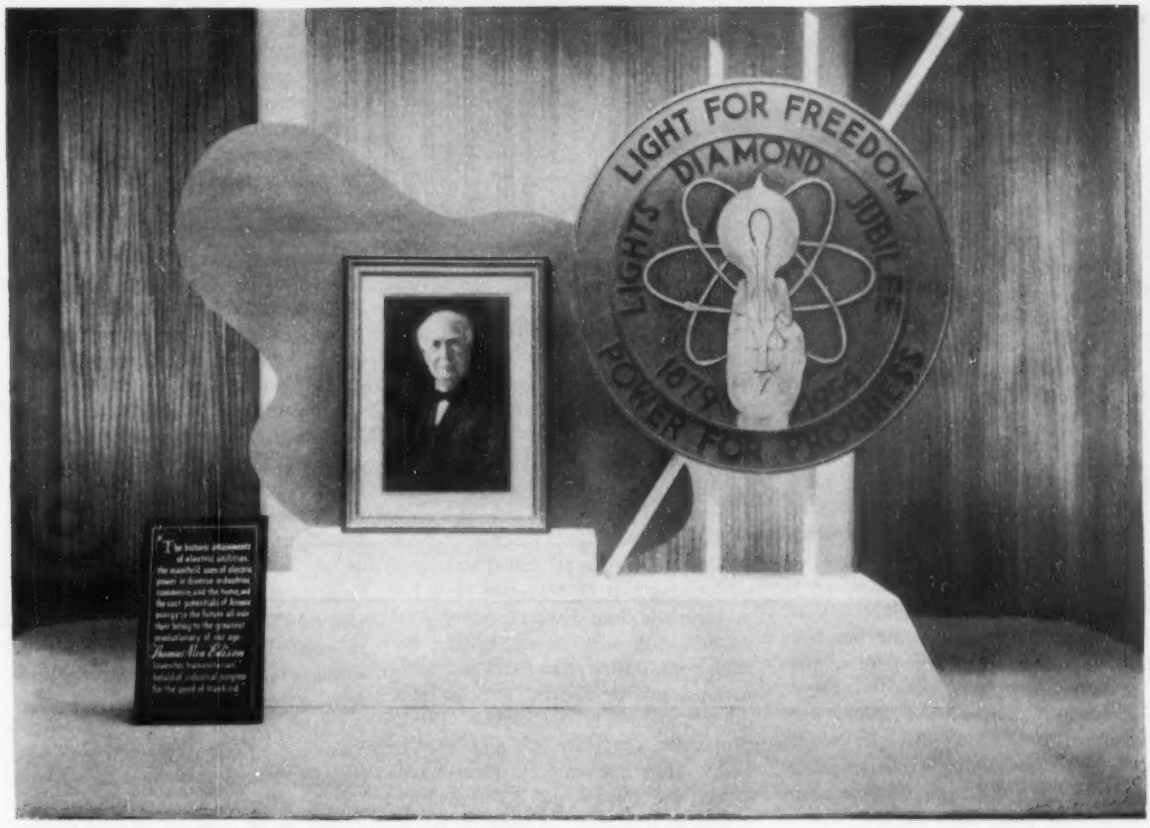
The jubilee will appear more and more frequently in newspaper and magazine articles and stories, on television and radio programs, and in other ways designed to attract the public's attention.

But if the electrical industry is to achieve maximum awareness in the American people of what the jubilee means, every individual and organization in the industry itself must live the jubilee this year.

Every ordinary operation, every special occasion which offers a chance to tell the jubilee story should be utilized.

From the start that has been made, it is clear that a great many people in this industry have already recognized the jubilee for the priceless opportunity it presents. Not until Light's Centennial—25 years in the future—will there be anything approaching this year's anniversary opportunity.

PREPARING JUBILEE promotion for EEI annual sales conference. Eleanor Wiese, Public Service Electric & Gas Co; Paul Penfield, Detroit Edison Co; C. A. Stevens, Public Service Electric & Gas Co; Larry Dunn, Hartford Electric Light Co



Restraint and dignity characterize this Philadelphia Electric Co window

Power Companies Swing into Jubilee

Reports on plans for celebration indicate the industry realizes its opportunity in employee and customer relations and in commercial activities afforded by diamond anniversary

Commercial activities, customer and employee relations, all mass communications of power companies, will be strongly permeated this year with the theme of Light's Diamond Jubilee. This is the conclusion to be taken from responses to a request made to power companies for information on their plans for celebration of the jubilee.

The request was sent to 163 companies. The 70 replies received constitute an extraordinary response, evidencing the enthusiasm with which the jubilee idea has been accepted. Although a number of replies report plans not crystallized at the time of response, all of them indicate participation in the celebration. Some companies sent in mimeographed or printed sheets. From these indications that the copies were produced in more or less quantity, we take it upon ourselves to say that such copies probably are or can be made available to any who may want specific jubilee suggestions. These companies are:

Atlantic City Electric Co
Boston Edison Co
Central Hudson Gas & Electric Corp
Dayton Power & Light Co
Pacific Gas & Electric Co
Public Service Co of Colorado
Union Electric Co of Missouri
United Illuminating Co

Here, arranged in alphabetical order, are summaries of the 70 replies:

American Gas & Electric Service Corp . . . Participation of AG&E companies in the jubilee celebration will be, for the most part, through advertising, displays on company premises, and support of the national television program. Tie-ins with local events will be made when and where suitable and feasible. The jubilee story will be the basis of frequent news releases and of talks before local groups throughout

the year. All details have not yet been worked out.

Arizona Public Service Co . . . Company will use all available publicity media including speeches, films, and billboards. Special displays and exhibits will be provided at the stockholders meeting, fairs, appliance shows, and local celebrations. Statewide essay contest in schools. At one outdoor affair in May, meeting will start with kerosene lamp lighting, later a bank of 10-kw lamps turned on to show progress.

Atlantic City Electric Co . . . "Ideal" is the only word to describe this company's opportunity for celebration of Light's Diamond Jubilee. And the company is making the most of it. This year Atlantic City is 100 years old, and the jubilee theme has been adopted as part of the centennial celebration. With many occasions for its observance before and after, high point of the jubilee will be in the first week of June during the annual convention of the Edison Electric Institute. The company sent EW such a quantity of material that to present it in detail here would leave little or no space for reports from other companies. It must suffice to say that from the floodlighting of its own building in June, 1953, to a lighting festival next December, the Atlantic City Electric Co has been, is, and will be up to its ears in the Jubilee.

Bangor Hydro-Electric Co . . . Will participate, but how and to what extent have not been decided.

Black Hills Power & Light Co . . . Plans cover: 1. Newspaper advertising, 2. use of postage meter slug, 3. displays in windows and on floors of all company offices, 4. jubilee theme in booths at merchandise fair, 5. company float in parades in towns of service area, 6. films for showings to service and otner clubs, 7. radio publicity, 8. pass-out literature—Jubilee booklet, 9. billboards, 10. stories in employee magazine.

Boston Edison Co . . . Last December Boston Edison, New England Power System, and New England Gas & Electric Association cooperated in setting up a program of promotions for the jubilee. The program is under the general supervision of the Electric Institute of Boston. Activities for the first three months were carried on as scheduled. These included tie-in with the show "Ice-Capades" in January, special jubilee editions of employee publications, newspaper advertisements and releases, a luncheon on Edison's birthday co-sponsored with the Advertising Club of Boston, dedication of an extensive lighting exhibit in the Boston Museum of Science. Other activities scheduled are an "All-Industry" dinner on Oct. 21 and tie-in of the jubilee theme with municipal Christmas lighting.

All-year activities include use of jubilee emblem in all power company advertising and of blow-ups of it for window and floor displays; tieing-in of Jubilee with new street lighting installations, power plant tours and dedications; jubilee dances, outings, and other affairs of employee clubs; "Jubilee Courtesy Lamp"—new 150-w white kitchen bulb—distributed at cooking classes and other demonstrations, also given on calls by home service personnel; speeches to civic and other clubs; wide use of booklets, stickers, souvenirs, etc; lighting displays on fronts and in windows of local offices.

Boston Edison reports, "We are carrying forward with most of these activities and will supplement them with others as the year rolls on." Individual companies of the NEP and NEG&E systems join in the program to the extent each may desire.

California-Pacific Utilities Co . . . Program not completely worked out, but present plans call for the following activities in September and October: Newspaper advertising of jubilee; window displays; radio scripts; distribution of jubilee fact book to school superintendents and principals and newspaper editors and of booklet, "Electricity—Today's Genie," to high school students; talks at service club meetings.

Central Hudson Gas & Electric Corp . . . Edison's birthday was played up in February, and in March the jubilee was conspicuous in the dedication of a generating station. Range promotion in April and May is tied to jubilee by means of silk-screen posters distributed to dealers. Also in May the annual "Youth Indoctrination Scholarship Award" will be given added significance by the jubilee as will also the awarding of prizes in the annual school lamp building contest. Water heater promotion in June will again employ silk-screen posters. There will be a county fair exhibit in August. In October Jubilee TV show will be extensively promoted in newspaper space and in company and dealer show windows; 20,000 lamps in jubilee wrapper will be mailed to low-use customers; on Saturday before TV show special activities for children will feature release of balloons carrying gift coupons for electrical prizes.

Central Illinois Electric & Gas Co . . . Plans not complete but will include an activity built around first local residence wired for electricity.

Central Illinois Light Co . . . Jubilee emblem is being used on postage meter. Jubilee film is being showed to high school groups, girl scouts, and others. Exhibit in "Heart of Illinois" annual fair. Jubilee theme to be featured in regular lamp bulb campaign in September. Stories in bill enclosures. Community observances are contemplated in the fall, but plans not yet crystallized.

Central Illinois Public Service Co . . . Office displays, imprints on service bills, advertising, color movie, lighting demonstrations featuring Jubilee in high schools, also to PTA, service and women's clubs; TV and radio spots.

Central Maine Power Co . . . Plans not yet definite.

Central Vermont Public Service Corp . . . Joint celebration of jubilee and 25th anniversary of company in fall. Other activities not yet decided on.

Cleveland Electric Illuminating Co . . . Plans not yet far enough along for report.

Parade float of Tampa Electric Co plays up the Jubilee's diamond aspect

Commonwealth Edison Co . . . "We have joined with other organizations in our territory, such as the Chicago Electric Association, Chicago Lighting Institute, various technical societies, and representatives electrical manufacturers, in setting up a Chicago and Northern Illinois executive committee to implement various activities during the year. Under this executive committee will be task committees covering advertising and publicity, speakers bureau, special events and community activities.

"We hope to establish and maintain a continuing program through the year. Arrangements are already under way for a Diamond Jubilee luncheon in Chicago on Oct. 21.

"The executive committee has a number of other special events under consideration although the exact details and time schedule cannot yet be announced. Any of the ideas and plans suggested by the national committee which are applicable to our territory will be used."

Connecticut Light & Power Co . . . Frequent advertising and publicity releases with increased emphasis in October leading up to TV show. Articles in bill inserts and employee magazine. Tie-in with lamp bulb campaign. Window and floor displays in company stores. Plant tours. Jubilee card on company trucks. Exhibits in county and other fairs. Local TV show joint with neighbor power companies.

Consolidated Edison Co of New York Inc . . . Plans not completely formulated.

Consolidated Gas Electric Light & Power Co of Baltimore . . . "Complete plans are not available as yet, but we have already started to publicize the jubilee by the use of radio, articles in our house organ and speeches before our service clubs. A continuing program with displays for dealers, banks and building and loan Associations, as well as a series of window displays for our own company, is in the making. Company vehicles will carry the jubilee emblem. It is proposed to culminate our company's celebration in this area at a joint meeting of the Baltimore Association of Commerce, electrical contractors and dealers, at which time we plan for the principal address to be delivered by a nationally known speaker who will stress 75 years of electrical progress.

"We are also contemplating a special 'lamp bulb sales to fill empty sockets' and an exhibit at the parade of homes in conjunction with the Home Builders' Association. Special emphasis over the next few months will be given to electric plant tours for opinion-forming groups and students. One of the features of the principal week in October will be the costuming of contact employees in our main and branch stores in reproductions of clothing of 75 years ago.

"The usual publicity through radio, television, and press will be utilized all through the year as occasions arise. Special showings of the film being produced by Light's Diamond Jubilee Committee will be scheduled as soon as the film is available."

Dallas Power & Light Co . . . Exhibit in local home builders show will feature jubilee theme as will window displays, radio and television spots, and possibly billboards. Exhibit in Texas State Fair.

Dayton Power & Light Co . . . In addition to extensive use of jubilee material in advertising and publicity, company and dealer window and floor displays, fair exhibits, etc, DP&L will try some other ideas. One is to ask public libraries to set up exhibits of books dealing with electricity and its history. Another is to see if high school and college bands might not include the jubilee theme in their performances at football games. A parade is being considered, also a suggestion that a special offer of cost concessions in residential wiring and lighting improvement for a specific period in the jubilee year.

Delaware Power & Light Co . . . For schools, civic social and business organizations, PTA groups and women's clubs, and local Chamber of Commerce, schedules of lectures and films, including distribution of jubilee material, are being arranged. Special meetings will be promoted. "Jubilee Days," featuring lamps in retail stores. Distribution of "Diamond Jubilee" lamp bulb to selected groups. Tie-in with adequate wiring promotion to builders. Enlist state facilities in promotion. Extensive local advertising and display throughout service area.

Detroit Edison Co . . . This company is most favorably situated for especially significant jubilee activjties. At nearby Dearborn are the original Edison laboratory and machine shop, brought from Menlo Park, the Ford Museum containing a great quantity of early electrical apparatus, a replica of the Pearl St station with one of Edison's "jumbo" dynamos in operating condition, and the impressive Greenfield Village reproducing the American scene of Edison's boyhood.

More importantly, there survives at Dearborn the spirit of Henry Ford's admiration and friendship for Edison which can be counted on for cooperation with Detroit Edison in celebration of Light's Diamond Jubilee, just as it animated the Golden Jubilee in 1929. Lack of sufficient space prevents detailing these activities here.

Additionally, Detroit Edison will weave the jubilee theme into all its customer and employee relations activities, including cooperation with local electrical interests, dedication of and open house at a new power plant, and scholarship awards.

Empire District Electric Co . . . Plans are not complete but cover window displays and newspaper, radio and TV publicity. Jubilee theme will be emphasized in open house at power plant when new turbo-generator goes on the line and in turn-on of new white way street lighting in Joplin, Mo.

Fitchburg Gas & Electric Light Co . . . Will publicize the jubilee in October, climaxing with a special event to be arranged for the 21st.

Georgia Power Co . . . At fairs and other occasions of mass attendance, fireworks displays with set pieces of jubilee themes and Reddy Kilowatt. Float for local parades. Floodlighting of buildings. Speakers bureau, window displays, exhibits, advertising and publicity. Week-long showing in October just before national TV show of jubilee and other suitable films at downtown theatre with tickets distributed to high school students.

Gulf States Utilities Co . . . Tentative plans cover power plant visitations, featuring the jubilee in employee publication which also has wide circulation among customers and in which articles will relate the jubilee to the interests of customer groups such as oil, petro-chemical, ranching, etc, a series of institutional newspaper advertising based on these articles, displays in stores and in fairs and exhibitions.

Hartford Electric Light Co . . . Celebration will start with dedication of and series of open houses at new power station in spring, including an exhibit of lighting progress. Jubilee to be emphasized in annual report, employee magazine lighting campaigns, a model home, newspaper advertising and publicity, and talks to school and club groups. Contemplate floodlighting historical monuments and landmarks as well as company buildings.

Idaho Power Co . . . Plans not completed in time for inclusion in this report. February number of employee magazine carried history of the company.

Lamps of past days can always be depended on to attract public interest

Iowa Power & Light Co . . . Plans in development stage.

Iowa Public Service Co . . . Tie-in with Sioux City centennial celebration in July, probably a night parade featuring electricity "then and now". Window and other displays and attendant publicity.

Kansas City Power & Light Co . . . Celebration started with observance of Edison's birthday and continued with opening of all-electric home, exhibit of industrial progress and annual report in March. Through the spring and summer months and into September the jubilee will be featured in Greater Kansas City Home Show, electric range and air conditioning promotions, film showings, and National Home Week. In October, activities will climax in build-up to the TV show including Better Light—Better Sight promotion campaign and special number of employee magazine. Extensive publicity and advertising, utilizing all media—newspapers, radio, TV, handouts, car cards, billboards, exhibits, shows—will be continuous.

Kansas Gas & Electric Co . . . Sponsoring Ford Foundation exhibit, "Industrial Progress, USA", with emphasis on jubilee. Open house days at power plants, move into new office building, and all sales operations will feature the celebration which will be prominent in displays, speeches, advertising, all channels of mass communication.

Kentucky Utilities Co . . . Newspaper publicity, speeches, bill enclosures, etc. Fall lighting campaign tie-in with jubilee, window stickers supplied to dealers. Special events in largest cities on system but plans not fixed yet.

Maine Public Service Co . . . Plans not definite but will include newspaper and radio advertising and publicity, tie-ins with sales promotions, and postage meter slugs.

Metropolitan Edison Co . . . With plans still in the making, Meco will

Emphasis on Jubilee gives especial significance to electrical exhibits and displays at state and county fairs

publicize the jubilee whenever practical. Opening of new headquarters building in summer will provide occasion for large jubilee activity.

Monongahela Power Co . . . Principal activity will probably center around dedication of 135-Mw unit in the fall. Considering idea of company representative presenting commemorative scroll or plaque to the mayor of each incorporated community in service area.

Montana Power Co . . . Tying-in with local events, particularly 75th anniversary of founding of City of Butte, with parade float, window displays, other publicity. Dedication of electrical exhibits in Montana historical museum. Participation in "Farm and Home" week celebrations and in annual home show in conjunction with sales promotion.

Narragansett Electric Co . . . Plans not complete. Presentation of jubilee medallion to governor of state at engineering society dinner. Will sponsor LDJ dinner Oct. 21.

New Jersey Power & Light Co . . . Newspaper advertising, window displays with jubilee theme woven into sales promotion.

New York State Electric & Gas Corp . . . Space limitation prevents publication here of an inclusive abstract of the comprehensive jubilee plans of this company, which cover 26 separate items. Included are several that should be noted because they do not appear in reports from other companies. They are: Window lighting contests jointly promoted with local Chambers of Commerce. Ceremonies at night baseball and football games. Pageantry at half time at high school and college football games. Lamp bulb campaigns which will be exclusively youth operations with Boy Scouts and 4-H Clubs. Poster contest on jubilee theme. Simultaneous employee dinners in company districts. Ceremonial connection of company's 400,000th customer.

New Orleans Public Service, Inc . . . Jubilee will be featured in all promotional activities. Plans for specific observances not entirely crystallized.

Niagara Mohawk Power Corp . . . Plans not complete, but will include system-wide publicity, advertising and displays, an employee information program and participation in local events.

Northern Pennsylvania Power Co . . . Newspaper and radio advertising and publicity and articles in employee publication throughout the year. Window displays in company offices and stores of cooperating dealers. Lighting campaign featuring the jubilee. Other activities as occasions afford.

Northwestern Public Service Co . . . Jubilee theme featured in normal promotional activities.

Ohio Edison Co . . . Animated sign on roof and floodlighting of main office building. Also flood lighting of district office entrances. Essay contest for children 10 to 16 age on value of lighting. Open house at new plant. Extensive featuring of jubilee theme in commercial activities.

Ohio Power Co . . . Plans still in the making. Will feature jubilee theme in usual media.

Pacific Gas & Electric Co . . . This company has set up a most extensive series of jubilee observances, planned

in detail. Space is not available for a complete presentation here. The program started in February with a residential lighting promotion. In April comes a jubilee lighting exhibit and conference, a home lighting workshop in June, central station tours for science students in April-May and September-October, dealer cooperative activities in county fairs in June, July, and August, state fair exhibit in September, an electrical week Oct. 18-23 playing up the national TV show.

These and other activities, with details of their organization and accompanying means of promotion are set forth in 9 + sheets of single-spaced typing, impossible even to abstract here. But there is one project so ambitious as to deserve mention even though it is now only in the proposal stage. It is to light one of the towers of the Golden Gate bridge as a gigantic Christmas tree, 760 feet high from the water line!

Pennsylvania Electric Co . . . Jubilee theme will be stressed in home shows, fair exhibits, and community celebrations. All details not yet worked out.

Pennsylvania Power & Light Co . . . Plans include institutional advertising stressing the jubilee, special newspaper supplements with tie-in advertising of sales allies, jubilee featured in sales promotion, dedication of new power plant, local community celebrations including a special one of the original Sunbury plant, the first for 3-wire service built by Edison, decorative lighting of 23-story general office building, exposition and fair exhibts, plus window displays and other usual means of publicity.

Philadelphia Electric Co . . . "Because of the metropolitan nature of most of our territory, we are limtiing ourselves pretty much to the use whereever possible of the jubilee theme in all of our advertising and promotional activities."

That's a very modest statement of a very considerable effort, as Philadelphia Electric is outstanding for extensive and intensive promotion both alone and in cooperation with the Electrical Association of Philadelphia. Accompanying the statement were eight photographs of jubilee exhibits and displays already used, plus several promotional pieces featuring the jubilee theme. It is expected that additional projects following suggestions in the jubilee plan book will be undertaken.

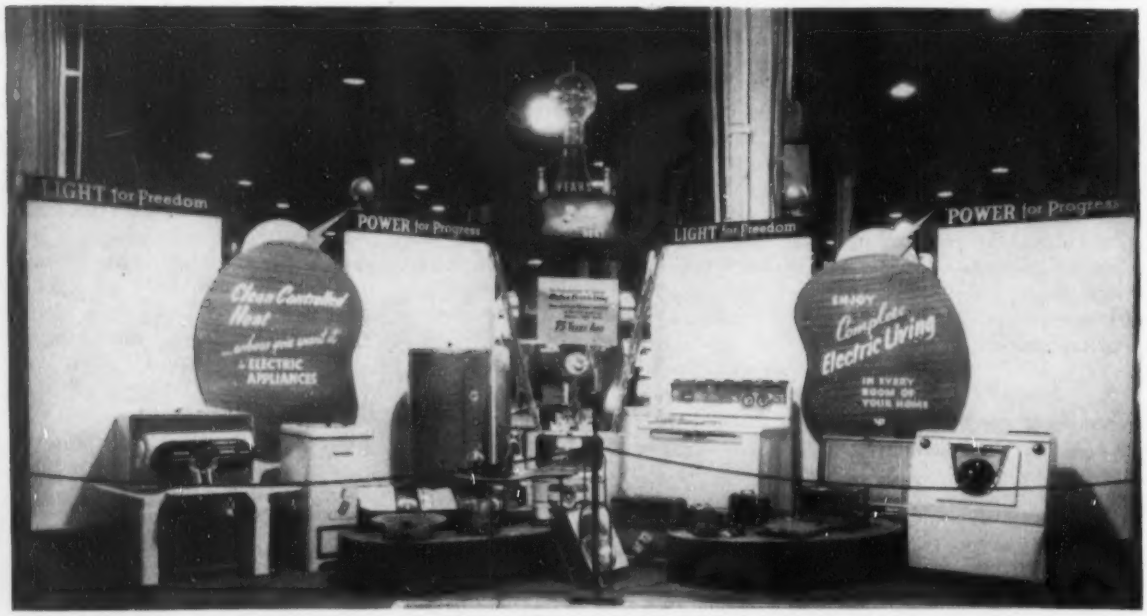
Portland General Electric Co . . . Will tie in jubilee with normal promotion, but plans for specific activities have not yet been fixed.

Public Service Co of Colorado . . . "The Magic Key", a two-act, hour-long, stage show, which has already been seen by 11,000 people in clubs, PTA's, schools, and civic groups, will be one of the principal means of getting the jubilee message to the public. Radio and newspaper advertising, displays and exhibits, plant tours, bill enclosures, speakers, light-conditioned homes, employee publication, employee meetings, all media of mass communication will be utilized.

Public Service Co of New Hampshire . . . Jubilee theme kept before the public throughout the year by continuous use in advertising and promotion. Will be emphasized in October with special displays, meetings, and publicity releases tying electrical progress in with significant events in local history.

Public Service Electric & Gas Co . . . Plans not yet decided on.

Puget Sound Power & Light Co . . . No definite plans as yet.



Giant replica of Edison's first lamp dominates home show exhibit of Electrical Association of Philadelphia

Large crowds are impressed with the Jubilee theme, conspicuous in annual Florida Electrical Exposition at Tampa

Rochester Gas & Electric Corp . . . Jubilee theme incorporated in customer publications. Dedication of museum exhibit. Lamp bulb campaign. New street lighting installations. Jubilee featured in all company promotions.

San Diego Gas & Electric Co . . . Although as yet incomplete, plans will include advertising, publicity, and showmanship of such intensity as to keep public attention on the jubilee. "Spring Fair," sponsored by local electrical association, will include exhibit of electrical progress. Program includes essay contests, films, speakers, newspaper and radio publicity. In the planning stage is installation of equipment on roof of main office building for a skyward shaft of light reflected by jets of steam.

Sierra Pacific Power Co . . . Advertising and publicity.

Diamonds, right and left at the Exposition entrance, symbolize the Jubilee

LET THERE BE LIGHT
see the HISTORY of LIGHT
A PERMANENT EXHIBIT
IN THE MILWAUKEE PUBLIC MUSEUM
SPONSORED BY THE ELECTRIC CO.
A comprehensive display traces the entire history of light from the torches of antiquity to the marvels of modern sources of illumination. Upon entering the exhibit through a curtain of light, you will see:
• The Stormy Petrel, a bird with such great oil content in its body, it often was burned as a torch.
• A display of original lamps from medieval and colonial days.
• A replica of Edison's first practical incandescent lamp.
• The smallest light source known, the "grain of wheat" lamp.
• Fluorescent and mercury lamps.
• The Panelescent light and many others.
It is particularly appropriate that this History of Light Exhibit sponsored by The Electric Company and created by the Milwaukee Public Museum staff will open this week.
February 11 is the 107th anniversary of the birth of Thomas Alva Edison, and 1954 is the Diamond Jubilee year of his invention of the incandescent lamp.
Make it a must to visit this interesting and educational exhibit at the Milwaukee Public Museum.
OPEN TO THE PUBLIC BEGINNING SATURDAY, FEBRUARY 13th
WISCONSIN ELECTRIC POWER COMPANY

Establishment of permanent museum exhibit is played up in advertising

Southern California Edison Co . . . Special advertising and articles, June-October, in newspapers, magazines, and company publications and on radio and TV. Extensive film showings and speeches to local groups. Window and lobby displays. Jubilee theme superimposed on youth programs. Jubilee "Days" at county fairs and other shows.

Southern Colorado Power Co . . . Plans not completely organized, but jubilee theme will be included in all promotional activities. Exhibit at state fair.

Texas Electric Service Co . . . Plans still in formative stage. Jubilee to be featured in employee publication and meetings, institutional advertising, plant tours, bill enclosures, window displays, radio and TV programs, speeches to local groups. Emblem used on bill envelopes.

Texas Power & Light Co . . . Newspaper advertising and radio spots. Other plans will be developed later.

Union Electric Co of Missouri . . . Extensive plans organized in meticulous detail, including assignments of responsibilities to specific personnel. Available space will not permit an adequate abstract of these plans. Best way to report them here is to say they cover 13 separate activities, are offset printed on 8 sheets, and, we presume to promise, will be supplied to any interested party who asks for a copy of them.

United Illuminating Co . . . Everything of a public and customer relations nature will be keyed to the jubilee whenever and wherever possible. In evidence whereof are 44 suggestions of ways in which the jubilee might be brought to public notice. Of these 28 have been adopted and others are under consideration.

Virginia Electric & Power Co . . . Plans still rather nebulous but will include promotion of jubilee in all custumer and employee activities. Will tie in with dedication of 100-Mw generating unit.

Washington Water Power Co . . . Will carry the jubilee story to all schools in service area. It will be featured in all commercial and public relations activities and in large sign on roof of company headquarters.

Wisconsin Electric Power Co . . . Will make as much use of the jubilee theme in company operations as is possible. "History of Light" in Milwaukee Museum. Exhibits in home show, county fairs and state fair. Special promotion of TV show in October.

Wisconsin Power & Light Co . . . Plans taking shape, with some already in operation. They include window displays, float for parades, lamp bulb campaign, dividend letter to stockholders, postage meter slug, annual report, newspaper, radio and TV publicity.

Wisconsin Public Service Corp . . . Presentations in high schools, employee essay contest, talks to local groups, mail stickers, films, newspaper and radio advertising, light-conditioned home, store and window displays, billboards, truck cards, imprint on customers' bills, lamp bulb campaigns, opening of new plant, emphasis on jubilee theme in October.

A Sketchbook of Jubilee Ideas

Many and various display pieces — plaques, medallions, translucents, signs, etc — are available for decoration of buildings, stores, offices, shop windows, streets and other public places in celebration of Light's Diamond Jubilee. A number of suppliers of such pieces are listed in the "Plan Book" published by the national headquarters of the Jubilee.

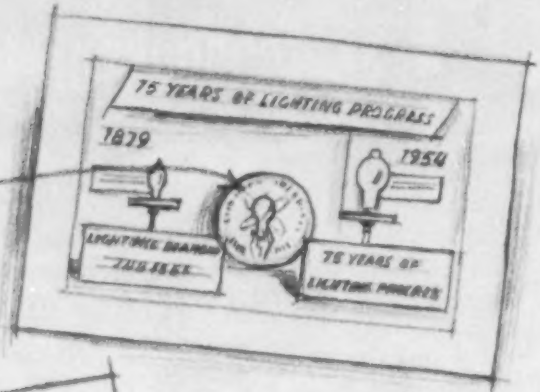
Whether much or little or no use is made of this commercially available material, the effectiveness of any display in exciting public interest will depend on the imagination and ingenuity that goes into the making of it. It is the purpose of this "Sketchbook" to suggest ideas for displays that can be locally assembled and in which as much use may be made of purchased items as is desired.

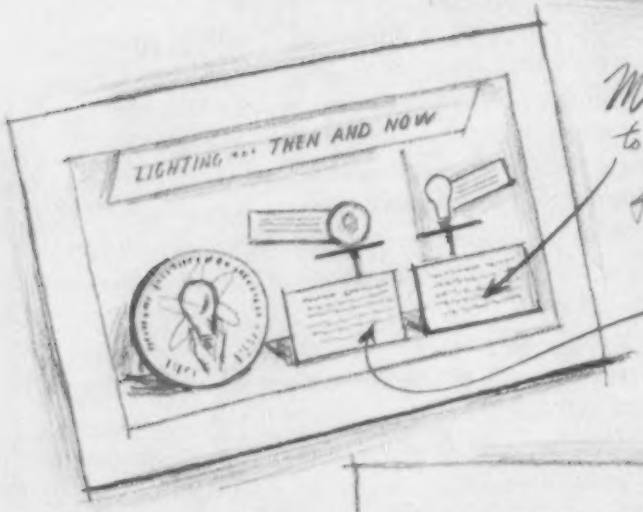
The ideas presented here are intended to serve as starting points for the exercise of local skill rather than as final designs complete with details of construction. It is quite astonishing what spectacular, exciting and interesting displays will result when a generous amount of imagination is stirred into a mixture of plywood, plastics, glass, lamps, tin cans and whatever other bric-a-brac may be on hand.

For the material in it and for cooperation in the preparation of this "Sketchbook," Electrical World is indebted to the Illuminating Engineering Society's Jubilee Task Committee whose chairman is Sam Hibben, well known in the lighting field for his uninhibited imagination.

Window Displays

Large gold L.D.J. plaque in center

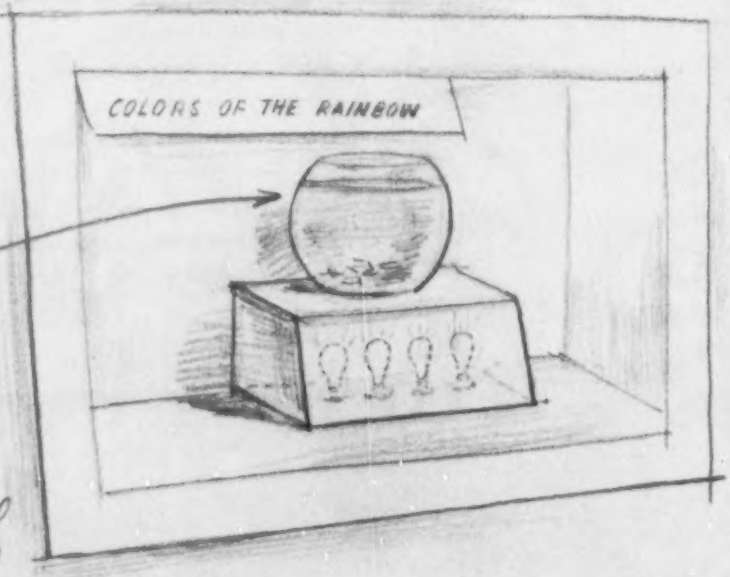




Modern man flip a switch today's inside to light up frosted bulb.

Cro-magnon men, first true homo sapiens, burned animal fat in shallow soapstone dishes like this

Glass bowl containing water and pieces of broken glass set over hole in box with varicolored flashing lamps inside, or bowl can be filled with colored Christmas tree lamps. Anything that will refract light can be used

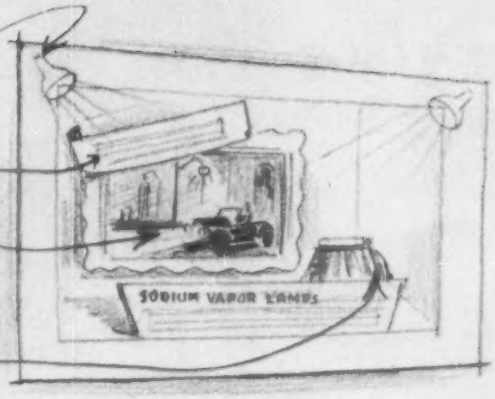


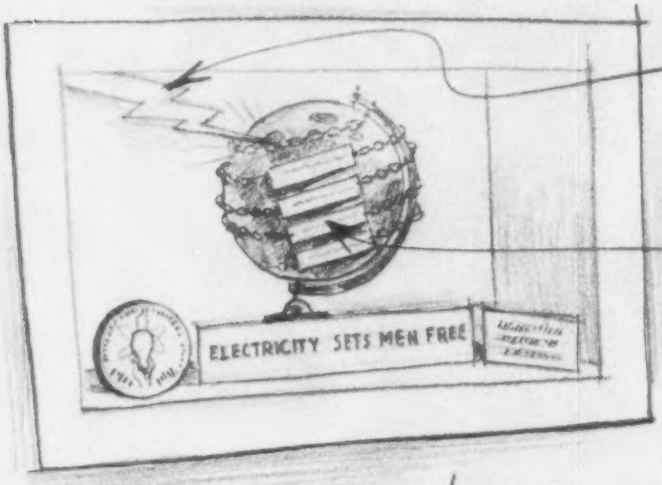
Floodlights with yellow filters

"And the streets were paved with gold" sodium vapor lighting

Blow-up of 1931 street scene

Sodium vapor lamp on cloth-draped pedestal





White cardboard lightning stroke breaking chain on world globe

Labels on chain:-

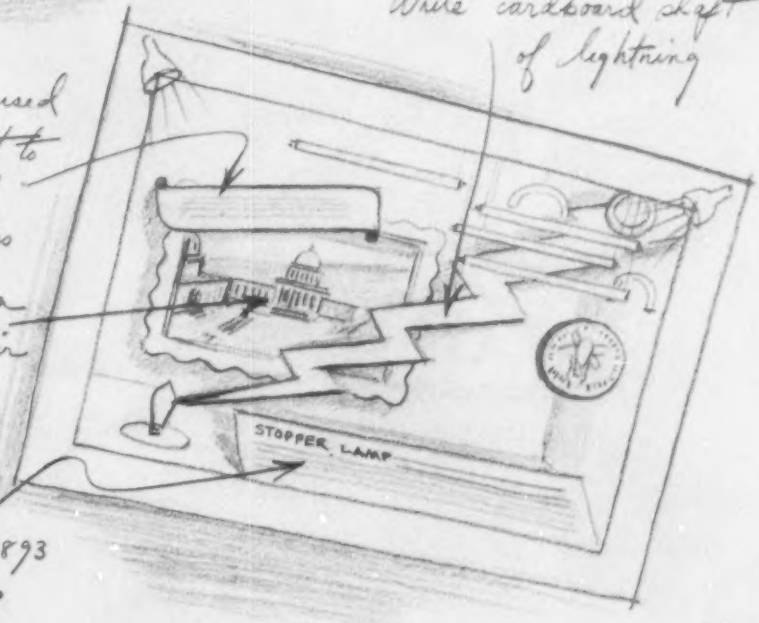
Ignorance
Darkness
Squalor
Slavery

White cardboard shaft of lightning

From the first lamps used with alternating current to the alternating shapes of modern fluorescent tubes

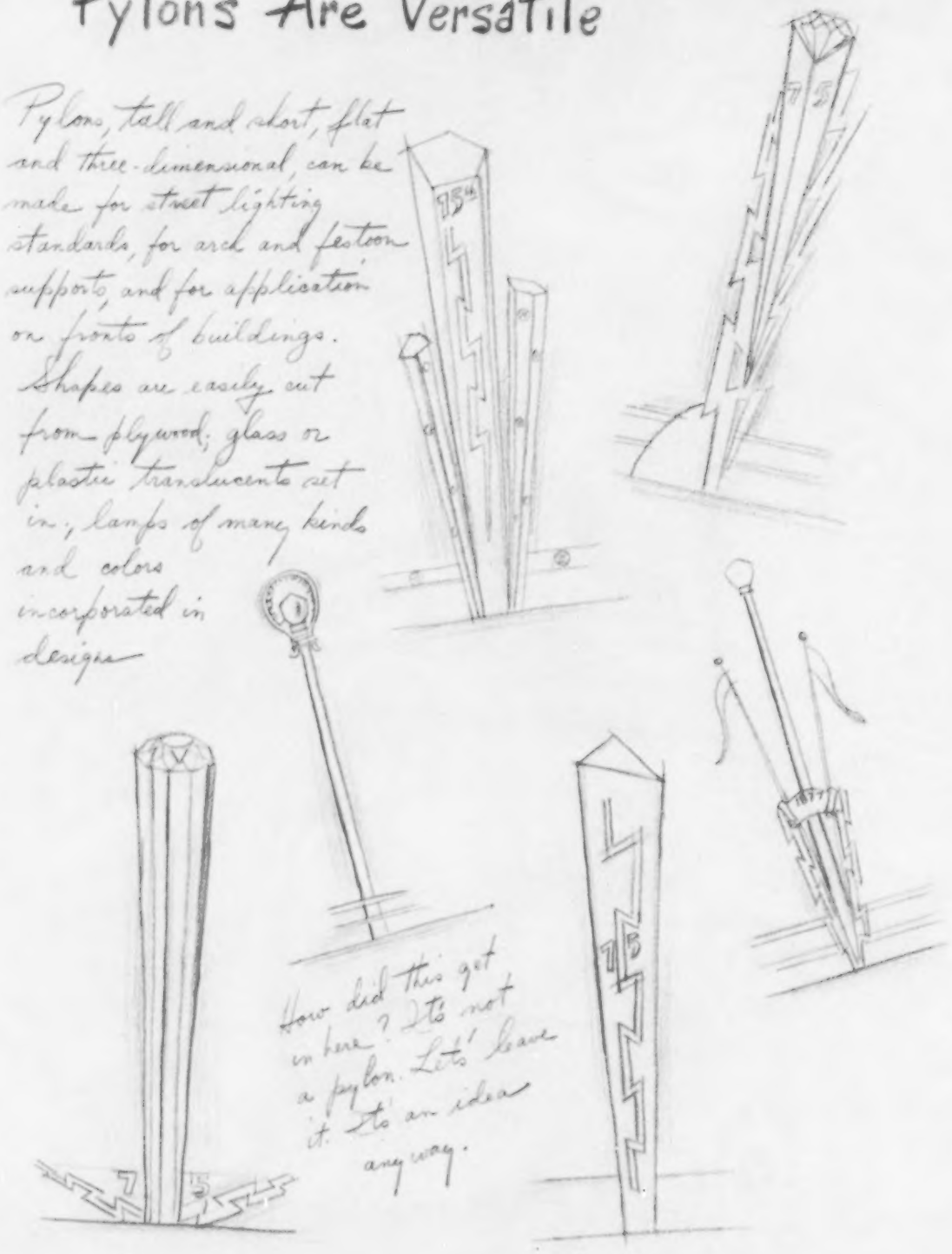
Blow-up of Grand Lagoon of 1893 Chicago World's Fair

World's first sight of big scale electric lighting was given by 20,000 "stopper" lamps at the 1893 World's Fair in Chicago

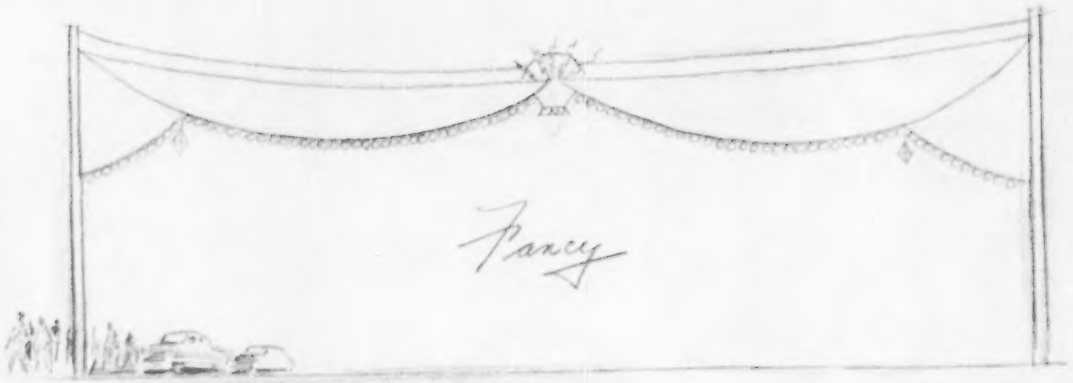


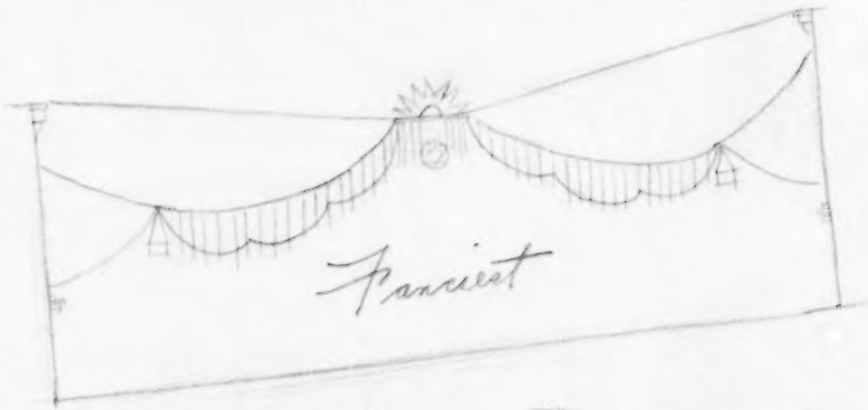
Pylons Are Versatile

Pylons, tall and short, flat and three-dimensional, can be made for street lighting standards, for arch and festoon supports, and for application on fronts of buildings. Shapes are easily cut from plywood; glass or plastic translucents set in; lamps of many kinds and colors incorporated in designs



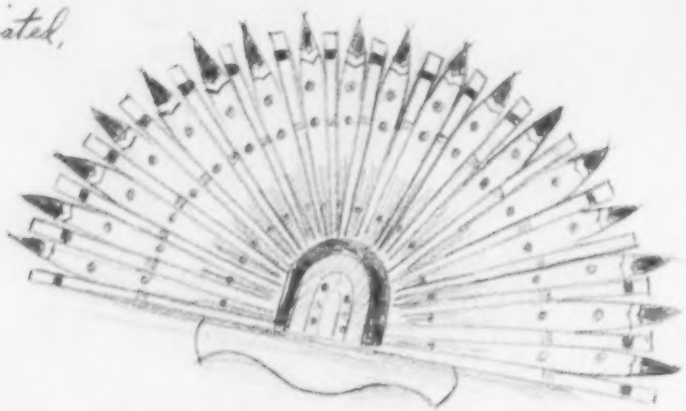
You Like Festoons ?

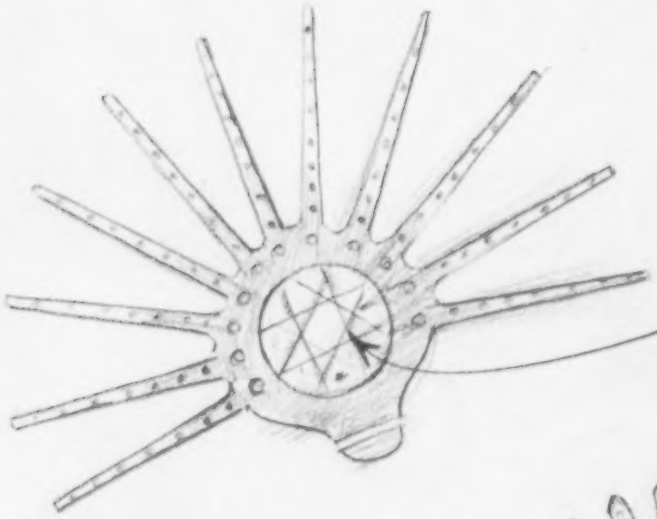




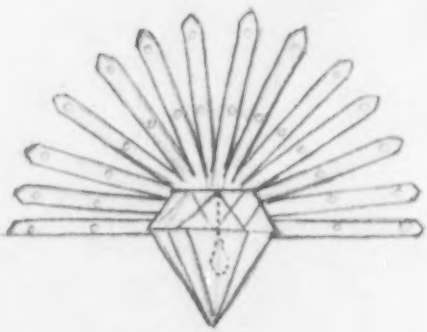
Sunbursts and Diamonds

These things look complicated, but they're really very simple. Cut them out of plywood and drill holes for insertion of Christmas tree lamps





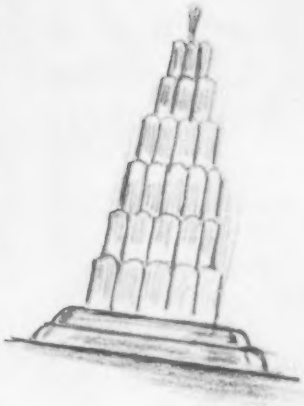
Glass or plastic, tossed up in diamond facets, or stuck in a transparency



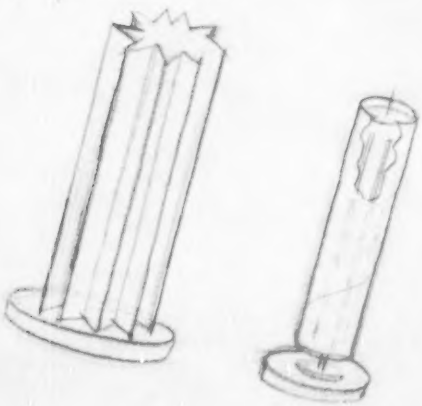
They can be used for festoon centers, be set on pedestals, or used on building fronts

Imagination Let Loose

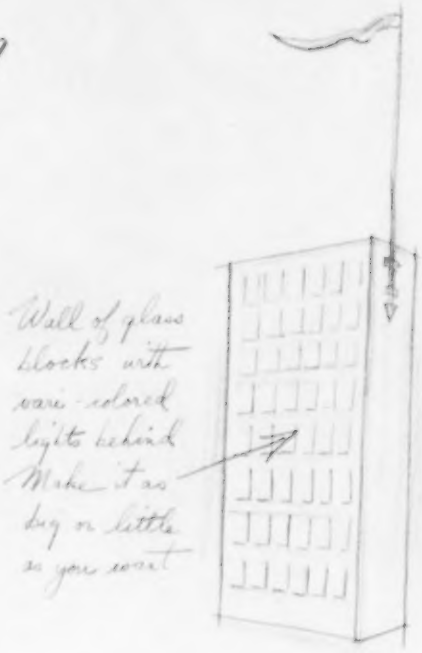
An electric plant—large artificial leaves with colored bulbs at the ends of aluminum tubes



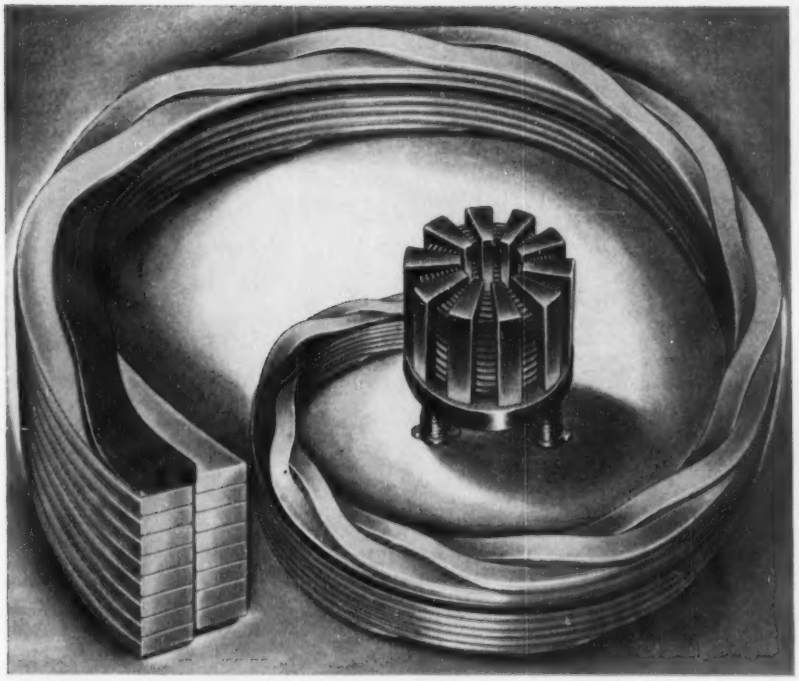
These designs are assembled of glass or Plexiglas translucent panels and may have a revolving colored cylinder or any other lighting arrangement inside. May be made any desired size.



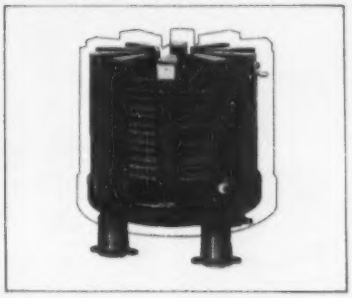
Something More Elaborate?



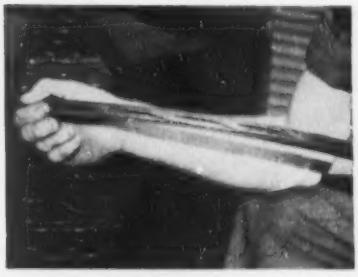
Here's a background for a window display, for a tableau, for a montage of company plants and structures, or maybe a billboard



CONTINUALLY TRANSPOSED RECTANGULAR CONDUCTORS—shown here schematically—are made possible by a specially designed machine. This exclusive G-E reactor feature results in more uniform current distribution and lower power losses.



COMPACTNESS Transposed conductors decrease volume up to 20%. You can fit G-E reactors in vaults too small for others.



ECONOMY By choosing G-E reactors with aluminum conductors you can save 10% on price without any sacrifice in reactor quality.

Compare . . . and you'll choose G-E Reactors

"Extra service" features of G-E cast-in-concrete reactors mean maximum protection and longer service life.

Industry's favorite for more than 35 years, G-E cast-in-concrete reactors offer you "extra service" features that make possible almost unlimited life with virtually no maintenance. For example:

Continually transposed conductor, an exclusive G-E feature, assures more uniform current distribution . . . lower losses . . . smaller dimensions.

Non-aging glass insulation gives greater short-circuit protection than any other wound insulation used in reactor manufacture . . . does not deteriorate even under high overloads . . . remains unaffected by moisture.

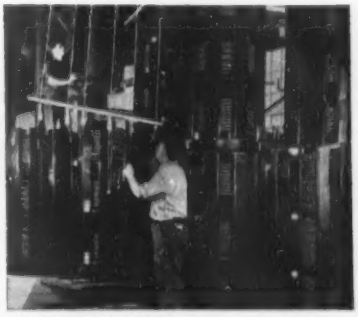
Wet steam curing of concrete assures full strength at shipment . . . eliminates potentially dangerous "in service" curing.

You also get such features as: good clearances; crossovers made within concrete; smooth, flameproof black phenolic varnish finish; and metal housings, complete with entrance and exit provisions, to minimize stray currents and protect reactors from damage.

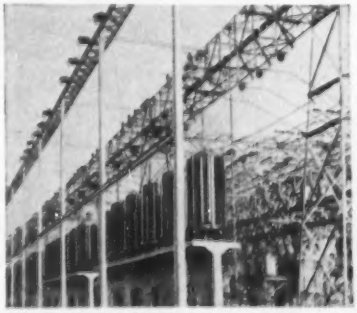
And you can have a 10% price reduction!

You can buy sturdy, dependable G-E cast-in-concrete reactors with either copper or aluminum conductors. By choosing aluminum conductors you can get the same long life, high short-circuit strength and low maintenance obtainable with copper conductors . . . at a 10% price reduction.

For full information contact your nearest G-E Apparatus Sales Office or write to General Electric Company, Section 422-8, Schenectady 5, New York.



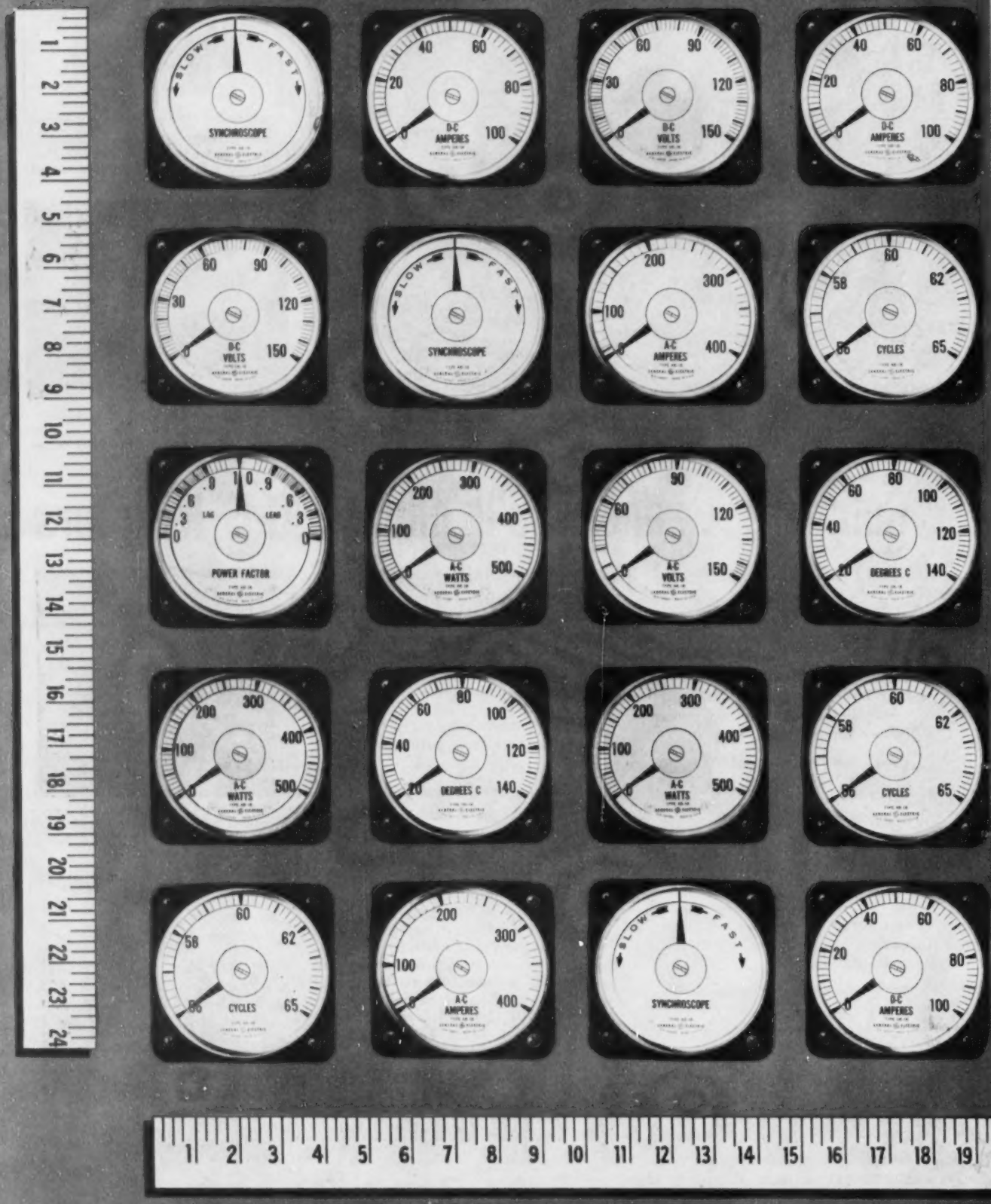
AVAILABILITY You can get shorter shipments when you order RM reactors thanks to G.E.'s "repetitive manufacture" program.

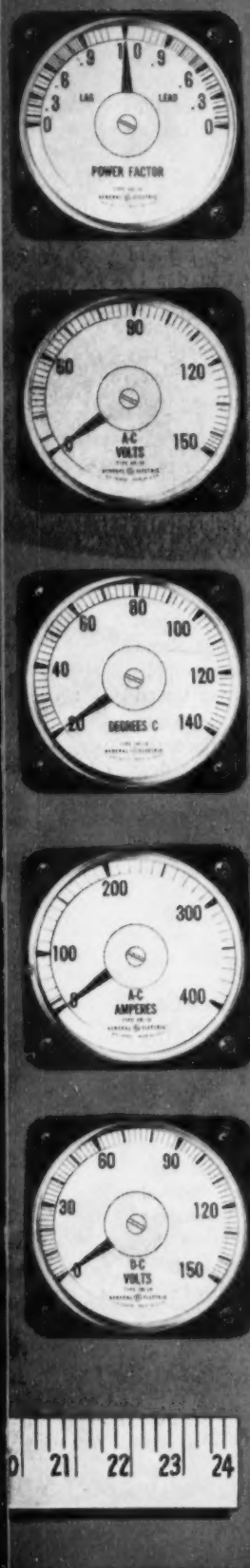


DURABILITY of G-E reactors is dramatized by this 30-year-old installation. It has given no trouble, needed little maintenance.

GENERAL ELECTRIC

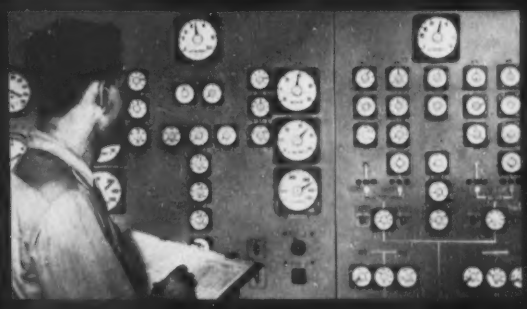
SWITCHBOARD INSTRUMENTATION





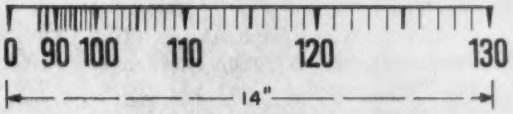
G-E small-size instruments fit 25 to a 24-inch square . . .

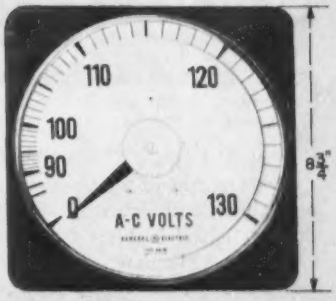
Make Panel Space Pay its Way



½-IN. SMALLER than conventional makes, General Electric's 4¼-in. miniature permits economical use of panel space. You can mount twenty-five on a 24-in. square.

TELESCOPIC READABILITY is an inherent feature of the larger 8¾-in. instrument—ideal for locations where convenience dictates taking readings at extra-long distances.





LONG CIRCULAR SCALE is straightened out above to show you why G-E instruments—big or small—are easy to read. A fourteen-inch scale on the 8¾-in. instrument and a full seven-inch scale on the 4¼-in. instrument are possible because each scale has a 250° arc. Readability is further increased by a raised convex window, which floods the shadow-proof scale with light from all sides.

For further details, contact your nearest G-E Apparatus Sales representative, or send the coupon shown at the right for a copy of Bulletin GEC-218.

SECTION B 602-289
GENERAL ELECTRIC COMPANY
SCHENECTADY 5, NEW YORK

Please send me a copy of your bulletin on the AB-DB 18 and AB-DB 16 long-scale switchboard instruments (GEC-218).

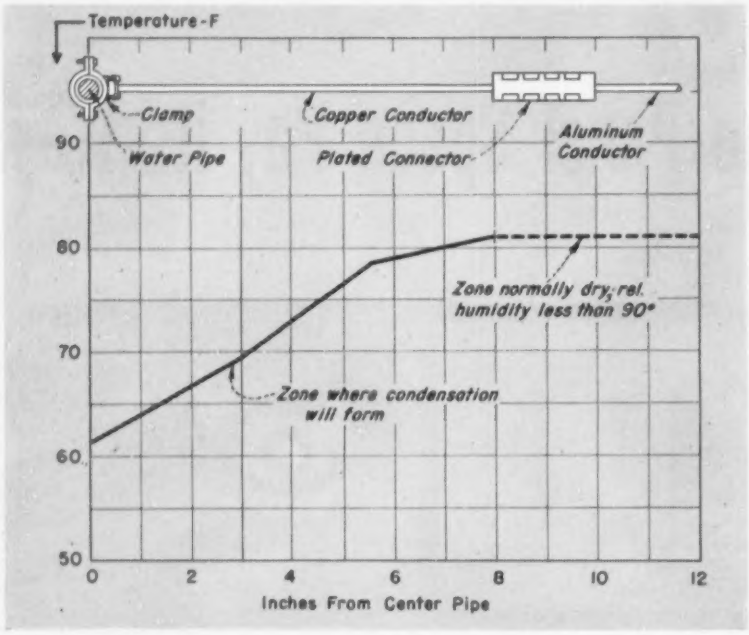
Name_____

Company_____

Street_____

City_____ Zone_____ State_____

GENERAL ELECTRIC



TEMPERATURE GRADIENT is shown along a No. 6 AWG, bare copper ground wire connected to copper water pipe. Methods of measuring and calculating the temperatures are given below

Aluminum Ground Connection Developed for Water Pipe

ROBERT HICKSON, Distribution Planning Engineer, Long Island Lighting Co, Mineola, N. Y.

Development of an aluminum-copper connection permits many builders in Long Island Lighting Co's area to use low-cost aluminum for service entrance neutrals and for running to wet water pipe grounds. Bi-metal contact with copper piping and corrosion are eliminated. National Board of Fire Underwriters has approved the connection.

The connection employs a compression-type, tin-plated, copper connector that joins the aluminum ground wire to a short length of bare copper, tinned copper, or tinned aluminum which is in turn connected to a suitable grounding clamp. The tap must extend vertically upward from the clamp to the connector to prevent moisture running from the pipe to the connector. Length of the special conductor from clamp to connector is sufficient to maintain the aluminum bi-metal connector at a temperature above the dew point so that it will remain dry under normal conditions.

Accompanying graph shows the most unfavorable temperature gradient condition measured along a No. 6 copper conductor attached to a copper water pipe. Temperatures at points 1.5 in. apart were calculated by measuring the change in resistance of small coils of insulated nichrome steel wire wound about the conductor.

Tests were made with various ambient and water temperatures with water running until steady state conditions were reached. Under average conditions—ambient 81.5F or less, water temperatures between 57 and 61.5F, and relative humidity 90% or less—condensation will not form more than 6 in. from center line of clamp.

This connection was developed because:

1. Water pipes in basements may be continuously wet during the spring and summer because of an average relative humidity of 75% and water temperature of 57F. Dampness accelerates corrosion.

2. Meter readers and testers cannot check ground connections on the water pipes because meters are no longer installed indoors.

3. Copper water pipe is being used for almost all new water services in this area. Copper to aluminum is the most difficult type of connection to maintain where moisture is usually present.

4. Galvanized steel clamps used on copper water pipes are also subject to electrolytic action that removes galvanizing. Steel is left unprotected and subject to rapid deterioration due to rust.

5. Effective grounding to the water service of each building is more important than ever because many water companies in this area are using transite pipe for water mains or non-conducting sealing compounds in the joints of cast iron pipes. These practices coupled with the high purity water result in a non-conducting water system.

Other applications for the connection are connecting bare aluminum wire to non-plated grounding clamps attached to steel and to non-plated transformer terminals. In these applications the length of copper or tinned conductor is not critical because there is no cold water flow to reduce the connector temperature below the dew point.

Further details of the connection are shown on the Engineering Reference Sheet, page 140, of this issue.

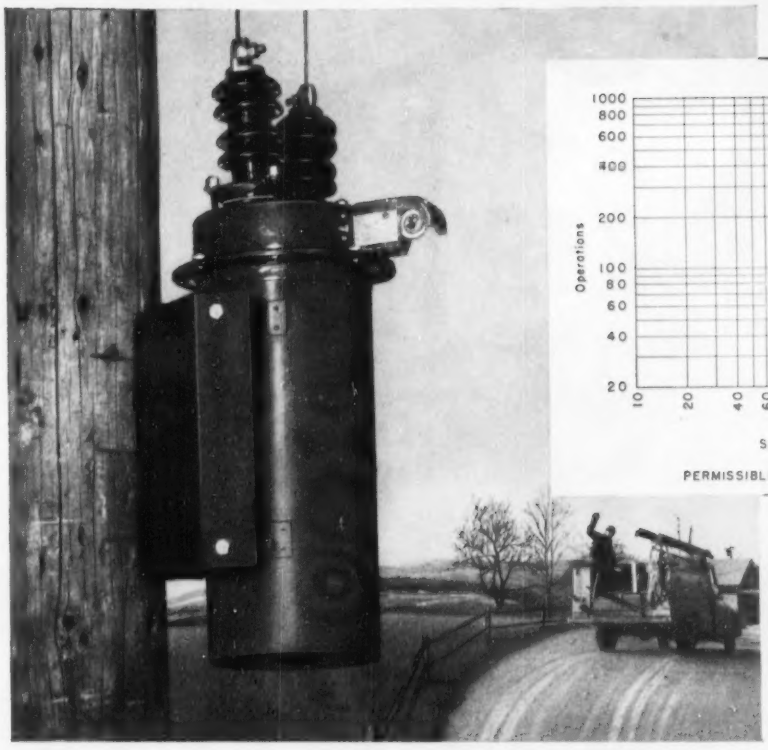
Swing-Joint Boom Speeds Handling of Turbine Bolts

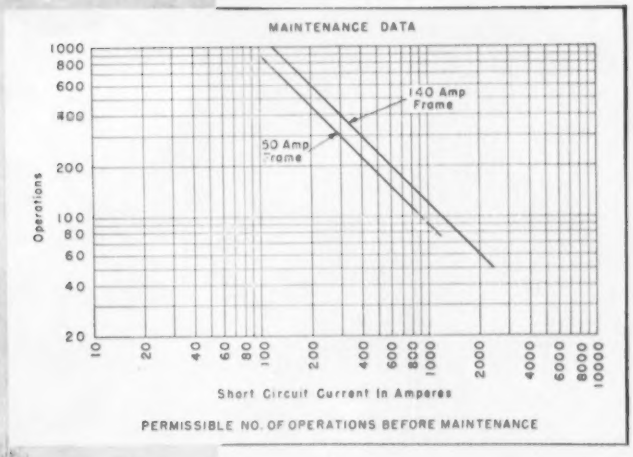
A. L. SMITH, Maintenance Supervisor, Sporn Plant, Central Operating Co, New Haven, W. Va.

A swing-joint boom attached to a hydraulic lift truck speeded removal and replacement of heavy bearing caps and shell bolts used along the horizontal joint of turbines at Philip Sporn plant. It was also used for handling other parts weighing 750 lb or less, and released the overhead crane for heavier work.

The boom consisting of 2½-in. piping with braces made of 1-in. pip-

(*Continued on page* 132)





NO MORE MAINTENANCE for this new General Electric recloser for another three years of normal operation—a maintenance schedule that means a saving of ⅔ over reclosers requiring annual inspection. Chart shows suggested number of operations before maintenance.

Now—save 66% on your recloser maintenance costs

G.E.'s exclusive Type FR Automatic Reclosers reduce need for inspection and maintenance to *only once in three years*

Now General Electric offers you a recloser that calls for less maintenance than any other recloser manufactured today. You can hang a new G-E Type FR automatic recloser on the pole and forget it for three years of normal operation. That's two years longer than the inspection and maintenance time considered normal for all reclosers. You save two-thirds of your recloser maintenance time and expense.

REASON FOR THIS LOW MAINTENANCE is the new "sealed-unit" design of the FR recloser. All points are effectively sealed from moisture and dust which cause oil contamination. The recloser is protected with a special rubber-seal operating handle which allows interruption gases to escape from the tank but prevents outside air from entering.

LONGER LIFE IS THUS ASSURED because moisture-laden air and dust are kept out. This prolongs the insulation ability of the oil and makes practical the use of inhibited oil which is furnished with all G-E reclosers.

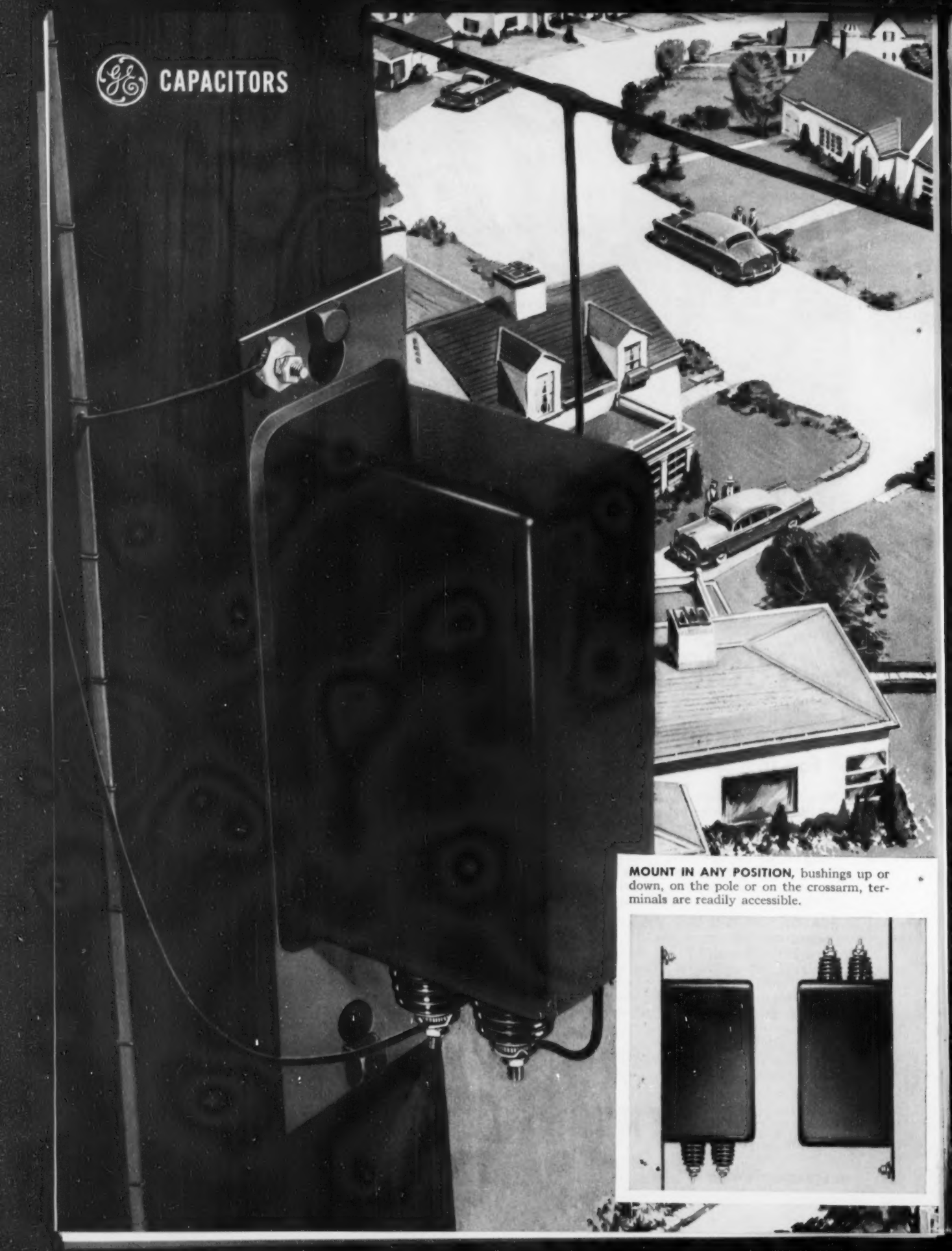
AVAILABLE IN the single-phase FR-1 model and the three-phase FR-3, continuous current of 5 to 140 amps, interrupting capacity of 125 to 2500 amps at 2400 to 14,400 volts—this G-E recloser design is completely interchangeable with other makes.

For more complete information on these reclosers, see your General Electric Sales Representative, or write for Bulletin GEA-5961, General Electric Co., Section 502-4, Schenectady 5, N. Y.

You can put your confidence in—

GENERAL ELECTRIC

CAPACITORS



MOUNT IN ANY POSITION, bushings up or down, on the pole or on the crossarm, terminals are readily accessible.

Now G.E. offers a

5-KVAR RESIDENTIAL SECONDARY CAPACITOR

New unit provides more kvar at lower cost to meet increasing demands of low power-factor residential loads

The trend toward larger distribution transformers and lower residential power factors has led General Electric to develop a 5-kvar 240-volt residential secondary capacitor to supplement its widely accepted 3-kvar units. This new unit provides all the benefits of the 3-kvar unit: improved voltage, reduced losses, and released capacity—and does it at lower cost.

One can be used in place of two

One of the new 5-kvar capacitors can in general be substituted for two 3-kvar units, as shown in the following application table:

Distribution Transformer Capacity, KVA	Suggested Number of Capacitors	
	3-kvar	5-kvar
15	2	1
25	4	2
37.5	6	4
50	8	4

And when you install only one unit in place of two, the economic advantages of the G-E 5-kvar capacitor are readily apparent.

Easily installed near the load

Like the 3-kvar, the new 5-kvar units are designed for direct pole mounting, but may also be mounted on crossarms or on brackets extending out from the pole. They can be mounted with bushings either up or down. A separate ground stud is provided to simplify grounding connections.

The unit is completely evacuated, filled with Pyranol* dielectric, and hermetically sealed. The case is made of drawn steel with rounded corners. These new units are now available for stock shipments.

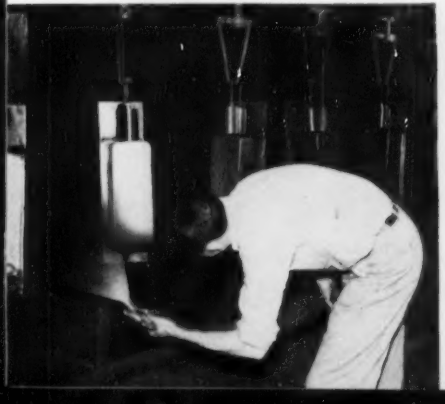
You can get full information on the new G-E 5-kvar residential secondary capacitor by contacting your G-E Apparatus Sales Representative or by writing General Electric Company, Section 441–9, Schenectady 5, New York.

**Reg. trademark of General Electric Company.*

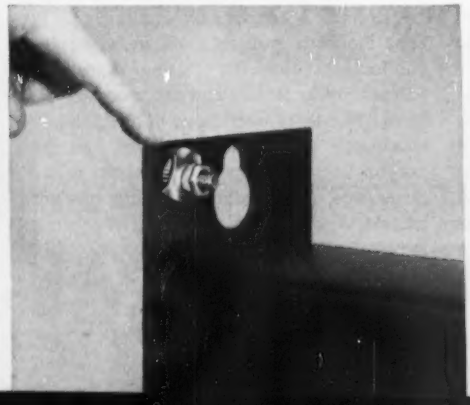
Progress is our most important product

GENERAL ELECTRIC

SUPER MELAGLYP, a new outdoor finish that averages up to 50% longer life in all types of atmospheres.



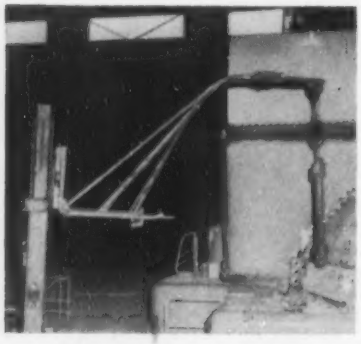
SEPARATE GROUND STUD, now on both the three and five-kvar units, is easily reached, simplifies grounding connections.



SHIPMENT FROM STOCK can now be made from factory and warehouses. Check with your G-E Sales engineer.

Boom

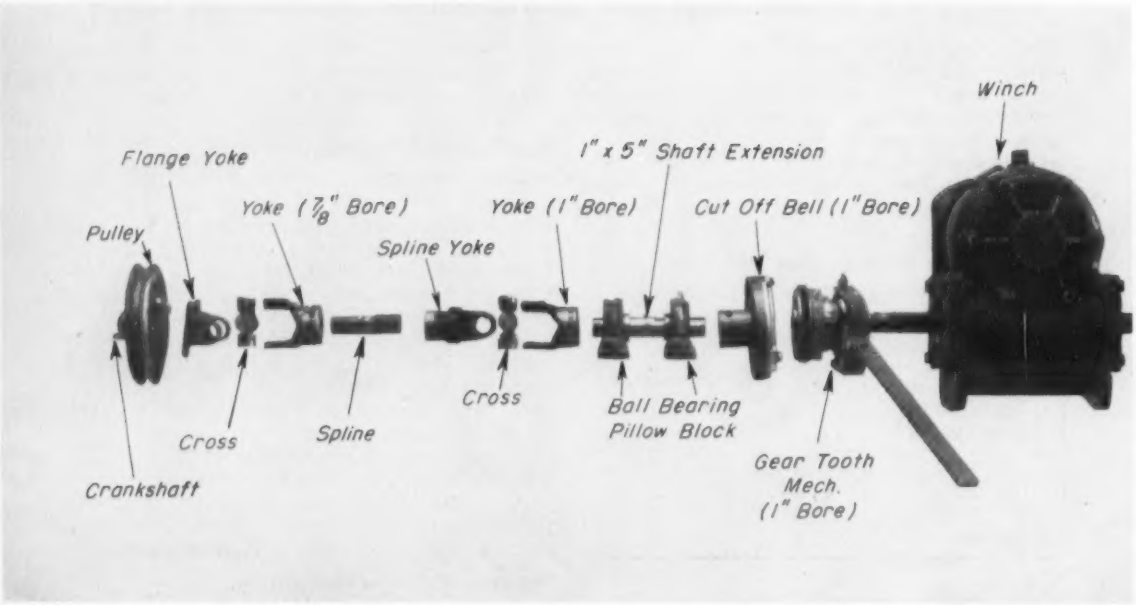
(*Continued from page* 128)



SWING-JOINT is a feature of boom attached to lift truck, facilitating removal and replacement of bearing caps, turbine bolts

ing attached to the truck fork extends 10 ft from the front of the lifting column. The boom tip will rise about 12 ft above the surface on which the truck rests. Hence, the boom will extend over the position of the bolts or bearing caps, permitting them to be lifted or lowered in a vertical line. A joint about 3 ft from the tip of the boom permits the tip to swing horizontally, 90 deg right or left, to facilitate handling the loads without moving the lift truck from the position in which it is operating.

Two lift trucks have been similarly equipped so they may be used simultaneously on each side of a machine to remove or replace shell bolts. The equipment saves several hours in handling shell bolts and bearing caps on each turbine overhaul because same operations with the overhead crane are slower. The truck boom can also be used for unloading trucks and moving things around the plant. Attachment or removal of the boom requires only 15 min.



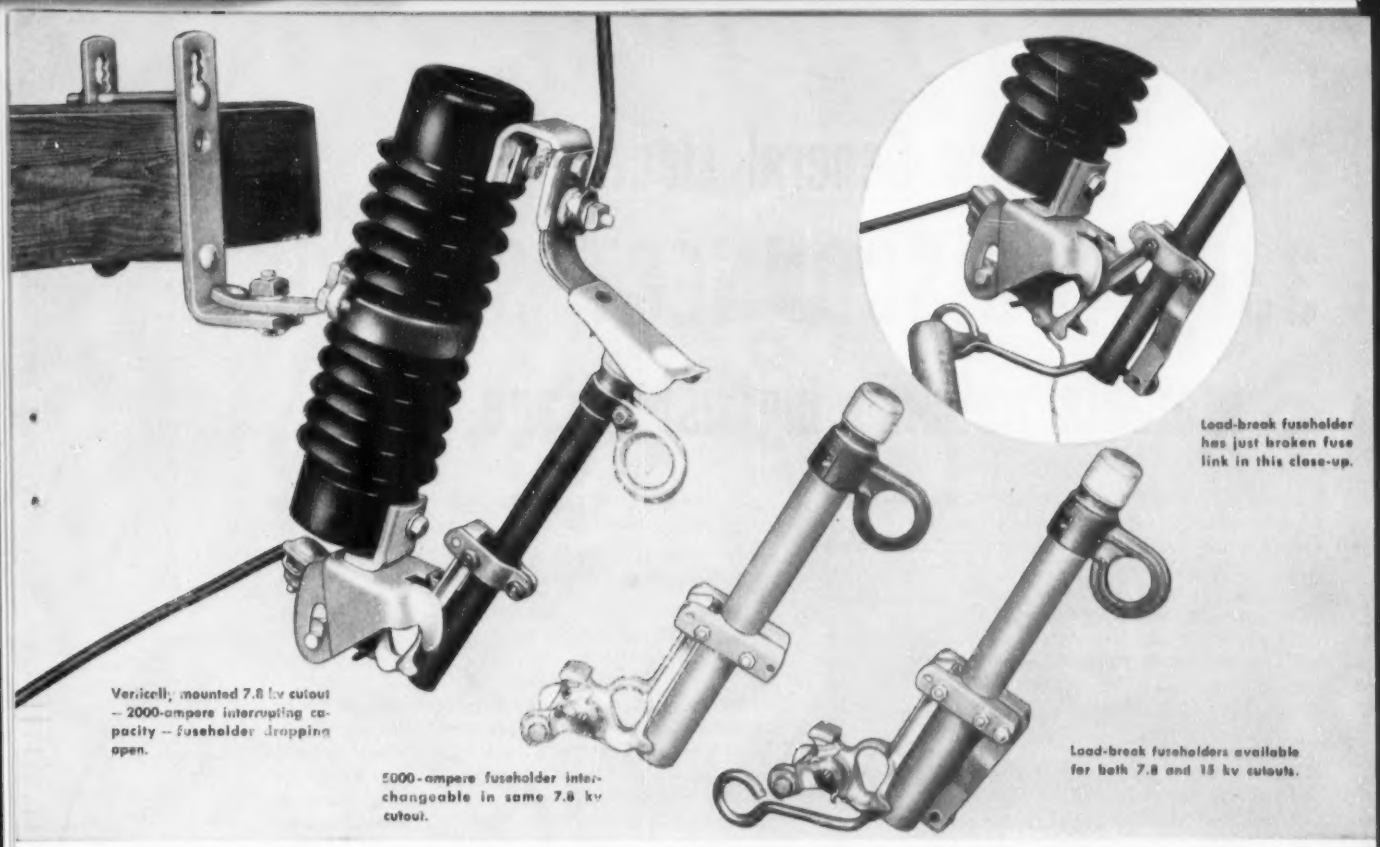
These parts connect front of engine crankshaft to winch mounted behind front bumper

Front-End Winch Saves Manpower

Dallas Power & Light Company's distribution department has developed a front-end winch that is used for many jobs previously requiring manpower. The winch is on a shaft coupled to the crank shaft of the truck motor through a clutch that is controlled at the winch. Throttle control is also at the front of the truck.

An operator standing at the front of the truck has clutch and throttle control in easy reach; the precision control thus afforded adds to the flexibility of the equipment and multiplies the number of jobs for which it can be used.

Front-end winch is used for pulling on rope lines attached to wire in sizes up to No. 2 copper, for pulling on rope blocks to pull up slack in larger conductors, and for raising transformers up to 50 kva and other equipment. For these operations, the winch eliminates need for manpower on pulling lines and is safer, furnishes a faster and more reliable pulling operation, and a special pulling truck is not required.



Load-break fuseholder has just broken fuse link in this close-up.

Vertical, mounted 7.8 kv cutout — 2000-ampere interrupting capacity — fuseholder dropping open.

5000-ampere fuseholder interchangeable in same 7.8 kv cutout.

Load-break fuseholders available for both 7.8 and 15 kv cutouts.

NEW G-E OPEN DROPOUT CUTOUT

For FAULT PROTECTION—standard or heavy duty and LOAD BREAK—up to full load at any power-factor.

New simplified design of General Electric 7.8 kv and 15 kv, 100-ampere cutouts have these extra features:

Birdproof Construction accomplished by unique method of clamping the mounting support to the opposite side of insulator from live parts.

Liberal electrical and mechanical strength. New hollow tube wet process porcelain has under-cut petticoats for generous creep and strike distance; and porcelain insert fired within tube provides inside solid barrier between top and bottom live parts. Screen prevents insect nest within porcelain. Clamping U-bolt around porcelain is insulated with molded polyvinyl chloride having excellent insulating and weathering characteristics.

Compression bolting to porcelain—top and bottom fittings are bolted to insulator with porcelain under compression—for maximum mechanical strength. Compression clamps inside the porcelain maintain tight assembly.

Shielded top contact and latch—by roof-shaped contour and having ball-point contact surface to top of fuseholder, the top contact and its latch are protected from dirt deposits and sleet.

Other distinctive features are retained: Hinge guides allow slamming fuseholder from any angle; threaded cap seal at upper end of fuseholder forces expulsion gases downward; silver-plated contacts shielded from corrosive agents; vertical or angle-tilted swivel mounting with EEI-NEMA bracket; latch provides time-delay opening—assures fault current interruption before drop-out action occurs; fuseholder tube of fiber and fabric-base Textolite* is water resistant, will not warp or split; close coupling of fuseholder to porcelain prevents multiplication of recoil forces.

For more information on these new open cutouts, contact your nearest G-E Sales Representative, or write to General Electric Company, Section 433-4, Schenectady 5, New York.

*Reg. trade-mark of General Electric Company

Progress is our most important product

GENERAL ELECTRIC

New General Electric

330-KV DISCONNECT SWITCH

protects nation's highest-voltage lines

General Electric disconnect switches, shown here on test in G.E.'s Switchgear Development Laboratory, are ready for service on the nation's first 330-kv transmission lines. They are the first of an order of 131 G-E switches of this type, all of which will be delivered during 1954.

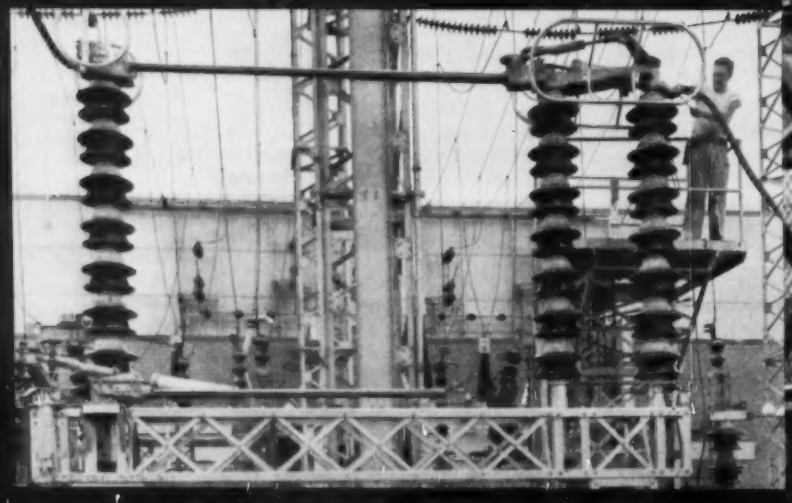
These switches, developed especially for use with huge new impulse circuit breakers like the one shown below, incorporate several unique advantages including—

1. Co-ordination of the switch-open gap with an 8-unit stack of insulators capable of withstanding 1425-kv impulses.
2. Silver-to-silver jaw contacts with low-pressure stainless-steel springs that increase compression many times during short circuits.
3. Sealed roller bearings for heavy duty and graphited-bronze bearings for lighter loads.
4. Base of built-up lattice construction for rigidity with light weight and easy handling.

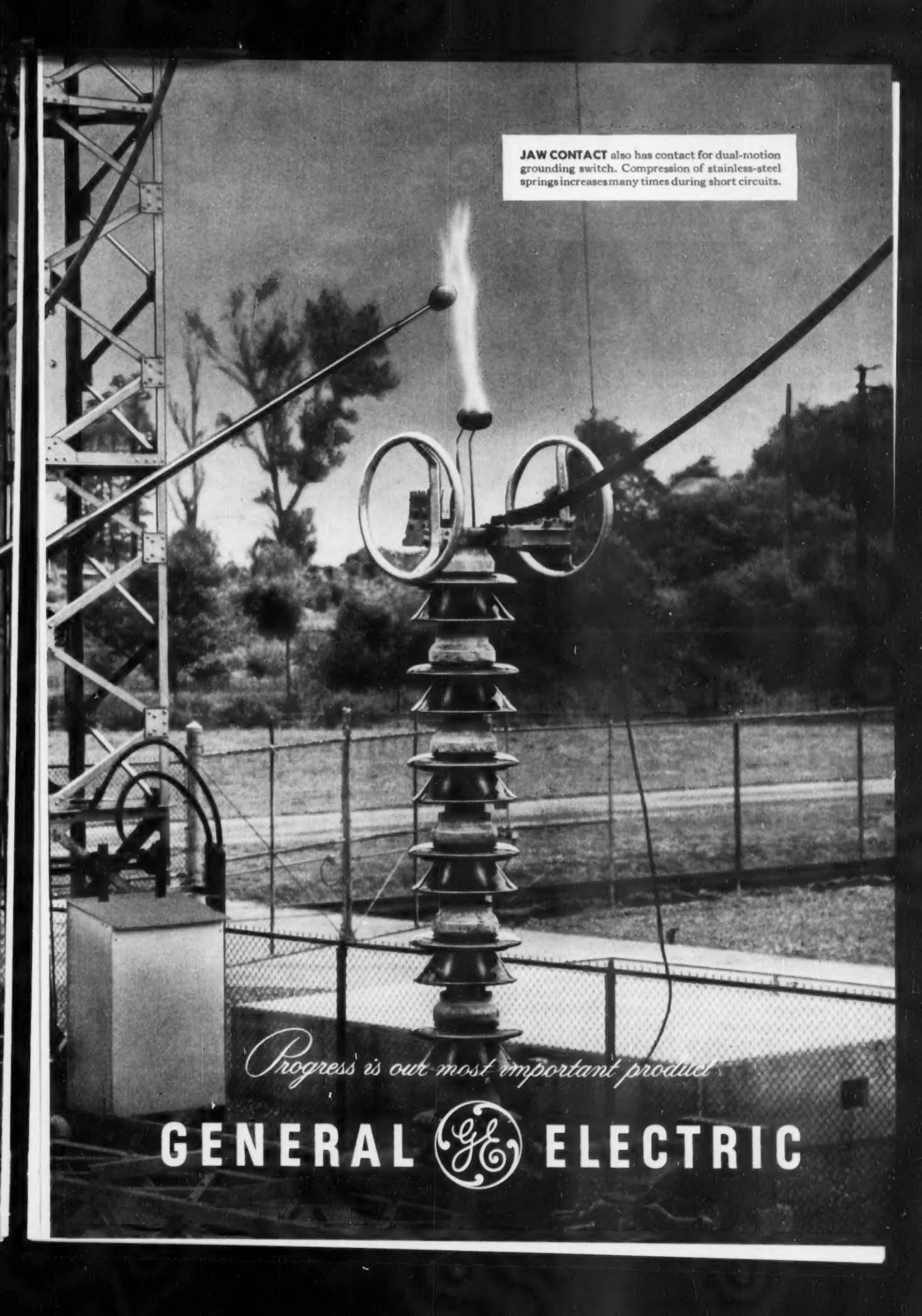
In working out the development of these switches together with the breakers they help protect, General Electric's Switchgear Development Laboratory at Philadelphia makes full use of its talents and facilities to solve power transmission and circuit protection problems. General Electric Company, Schenectady 5, New York. 503-1

CORONA RINGS AND SWITCH PARTS are shaped to eliminate visible corona and reduce possibility of radio noise that would interfere with reception.

330-KV CIRCUIT BREAKER—another G-E development for nation's highest-voltage lines.



CONTINUOUS RATING is 1600 amp, but the switch will carry 2000 amp for sleet melting. It easily meets 70,000 amp RMS asymmetrical rating.


JAW CONTACT also has contact for dual-motion grounding switch. Compression of stainless-steel springs increases many times during short circuits.
Progress is our most important product
GENERAL ELECTRIC

CABLE PLOW is a converted pavement ripper that digs an 18-in. trench, places the cable and uses a chain drag to back-fill the trench

UP A 26% GRADE, comes the tractor-trailer cable plow as it laid 7,500 ft of 5-kv single-conductor, armored cable in 5 hr and 55 min

Special Plow Buries Cable Up a Steep Hill

Installation of a 5-kv cable up a steep hillside was done easily and quickly for Southern California Edison Co by "plowing" the cable into the ground. The cable was laid by a "cable plow" consisting of a pavement ripping tractor-trailer fitted out to dig the trench, place the cable, and back-fill in one operation.

In all, 7,500 ft of single-conductor, synthetic-insulated, armored cable was laid up a 26% grade in 5 hr 55 min. The same length of time was required merely to hand lay 150 ft of cable at the line terminals where the trail was too narrow for the tractor to maneuver. The plow placed the cable 18 in. below ground level and used a chain drag to back-fill.

The cable plow was specially converted for the project by the contractor, Underground Electric Co. To check erosion along the cable route on the steep hillside, the contractor built about 600 dikes across the trail in addition to planting grass.

Scale and Chart Standards Pay Dividends

JOHN I. HOLBECK, Branch of System Engineering, Bonneville Power Administration, Portland, Ore.

Standardization of telemeter indicating scales and telemeter charts is paying dividends for Bonneville Power Administration. Use of standard scales makes it easier for operators to read values of telemetered quantities more easily and accurately, regardless of the make of the equipment. Universal charts for telemeter recorders simplify procedure, eliminate confusion in purchasing and stocking charts, and save money through stocking of fewer charts that cost less per chart.

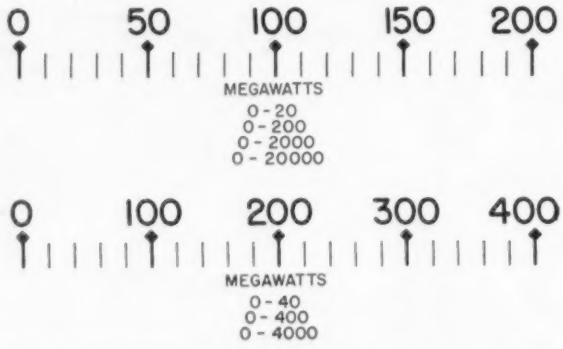
At present, BPA has 51 telemeter recorders installed over its far-flung system. One major problem when the telemetering program began was the selection of indicating scales for recorders. Standardization became necessary because each make had its own scale and standards among manufacturers varied considerably. Establishment of a scale standard for recorders somewhat similar to that previously set for all switchboard instruments became desirable.

Standardization has been achieved with nine scales for zero left instruments and nine scales for zero center instruments. These scales, together with their multiplies, cover all present ranges and any future scale ranges.

All telemeter indicating scales show the cardinal points and the divisions to be used. Numbers are sufficiently large so that they can be read easily by operators or load dispatchers from their desks. Cardinal lines are $\frac{1}{16}$-in. wide; minor division lines are $\frac{1}{32}$-in. wide. The same cardinal lines are used for an indicating scale of 0-20, 0-200, 0-2,000, and 0-20,000 Mw as shown in the drawing.

Separate standards have been adopted for recorder charts. Standardization has resulted in two universal telemeter charts, somewhat similar to strip charts for demand meters. One is a zero left chart and the other is a zero center.

(*Continued on page* 145)



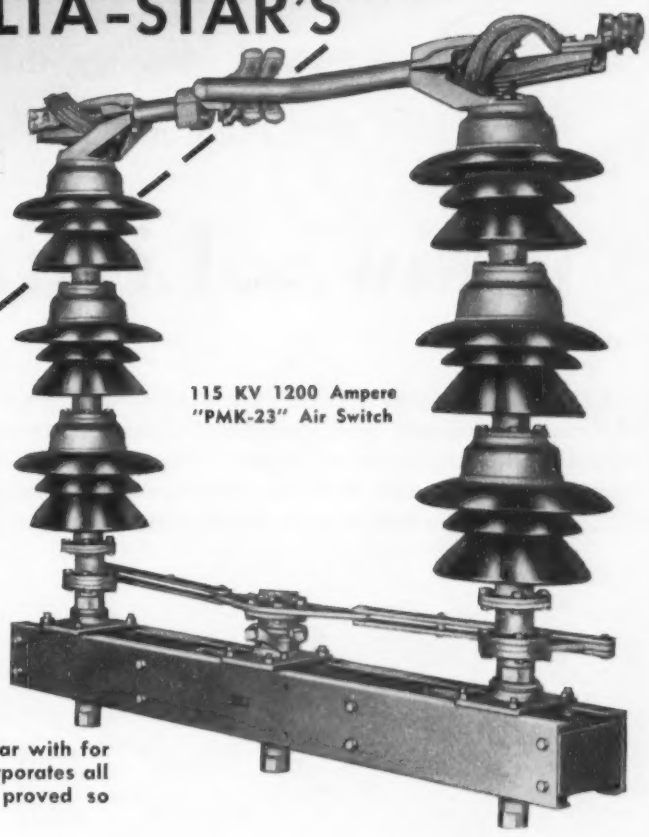
STANDARDIZED SCALE used on telemeter recorder has No. 500 LeRoy figures made with No. 6 pen and No. 165 LeRoy letters made with No. 2 pen. Scales are easily read with less error

a modern version of an old standby — DELTA-STAR'S

New

"PMK"

"PMK" 600 Ampere
Contact Assembly



115 KV 1200 Ampere
"PMK-23" Air Switch

Here is an old friend you have long been familiar with for substation and pole-top application. It now incorporates all the modern, trouble-free features which have proved so successful on other DELTA-STAR Switches.

Large, hard drawn copper contact shoes, with oval shaped silver inlays, operate against the hard drawn copper tubular blade to form a high pressure small area contact—assuring superior electrical and thermal characteristics.

Years of wear on the contacts and blade will cause no appreciable reduction in contact pressure because of the long multiple leaf pressure applying springs of fatigue resistant beryllium copper. These springs do not function as current carrying members.

Offset arrangement of contacts combined with the blade motion develops a twisting shear, easily breaking formations of ice and corrosion.

These features **plus** all the well-known standard features demanded by engineers, a minimum number of insulators per single pole element, one contact, tubular blades, free swinging bronze ball bearing terminals, minimum side and overhead clearance, and simple mechanism.

Available in "PMK-22" the two bearing type and "PMK-23" the three bearing type, for upright or inverted mounting in all standard voltage ratings from 7.5 to 161 kv at 400, 600 and 1200 amperes.

WHEN YOU WANT THE BEST IN HIGH VOLTAGE SWITCHING EQUIPMENT SPECIFY DELTA-STAR

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.
OF PITTSBURGH
2437 FULTON STREET, CHICAGO 12, ILLINOIS
DISTRICT OFFICES IN PRINCIPAL CITIES

On the Diamond Jubilee of Light, General Electric looks back

the first convenient source of light, banished the "dark ages".

for new efficiency, the white lamp for more dif-

few. These new developments have led the way to a

Now...Light for Seeing

GENERAL Electric's Light Conditioning Program brings a new dimension to home lighting. Truly "light for living", it meets the needs of today's larger families who are enjoying more leisure, spending more time at home. Simply by using more and better light, it pushes back the walls, dramatizes furnishings, brings new beauty and pleasure to home living.

Lighting engineers tell us the average home should have 15 lamps; it now has only 5! The 5-page adver-

After 75 years of pioneering Light for Seeing
General Electric brings you
Light for Living
• As interpreted by 4 of America's leading decorators
• Based on an idea by Thomas Edison
on the occasion of his birthday, February 11
GENERAL ELECTRIC
Your G-E Light-Conditioned Home
keeps chores
from spoiling fun
Your G-E Light-Conditioned Home
bring
the ups

You can put your confidence in—

to 1879 and Thomas Edison's first electric lamp. It gave the world Since then, General Electric has developed the fluorescent lamp fused light, the GA lamp for better appearance, to name just a revolutionary new idea . . .

becomes Light for Living!

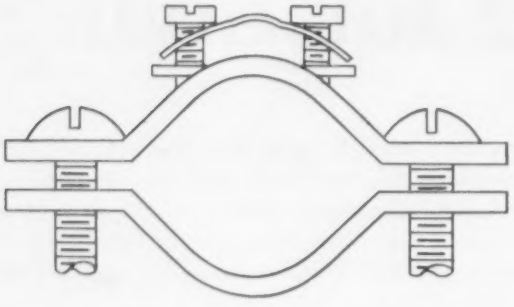
tisement shown below is an example of how General Electric's Light Conditioning Program helps people realize this need for better lighting. We believe "light for living", based on the famous G-E Light Conditioning recipes, will help the lighting industry to raise the standards of home lighting to match today's high standards of living. It can work in your community. For more information, contact your General Electric Lamp District sales office or write General Electric, Dept. 166-EW-4, Nela Park, Cleveland 12, Ohio.

GENERAL ELECTRIC

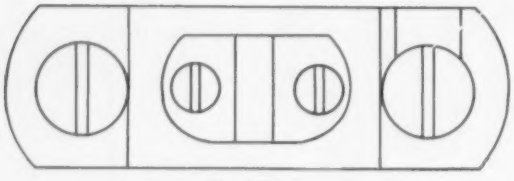
Aluminum Conductor Service Grounding

Terminal connections between aluminum conductor and water pipe are shown for house service grounding. This is an adaptation from Construction Standards of Long Island Lighting Co

ROBERT HICKSON, Distribution Planning Engineer, Long Island Lighting Co, Mineola, N. Y.



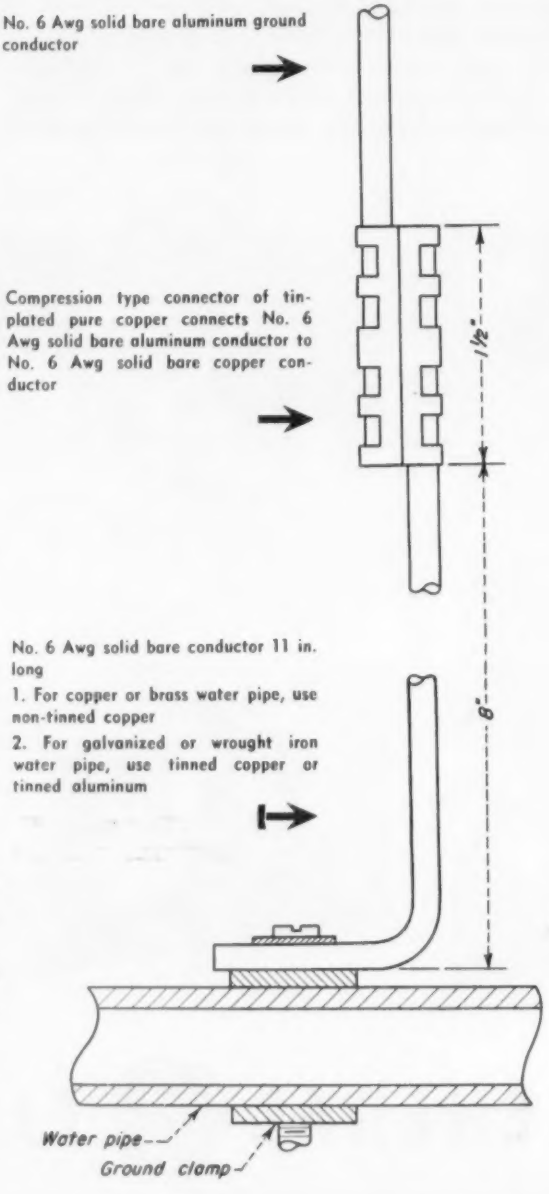
Side View



Top View

Ground Clamp, Its Form (above) and Composition
Type used subject to approval by Board of Fire Underwriters

1. For copper or brass water pipe, use copper, bronze or copper-plated steel ground clamp
2. For galvanized or wrought iron water pipe, use zinc-coated or cadmium-coated steel ground clamp


No. 6 Awg solid bare aluminum ground conductor
Compression type connector of tin-plated pure copper connects No. 6 Awg solid bare aluminum conductor to No. 6 Awg solid bare copper conductor
No. 6 Awg solid bare conductor 11 in. long
1. For copper or brass water pipe, use non-tinned copper
2. For galvanized or wrought iron water pipe, use tinned copper or tinned aluminum
1½"
8"
Water pipe
Ground clamp

NOTES

A. General: All connections and devices shown are subject to approval by Fire Underwriters. See Note C below.

B. Procedure for Using Compression-type Connector:
   1. Coat contact surfaces between aluminum conductor and connector with oxide-inhibiting compound; then brush conductor with wire brush.
   2. Insert conductors into connector—making sure neither conductor extends beyond the end of the connector—and press circumferentially at four points along its length to insure good electrical contact. Use a standard compression tool.

C. Conductor Size: The No. 6 Awg aluminum conductors (equivalent to No. 8 Awg copper) and associated fittings shown are the minimum size permitted by the Fire Underwriters Code for No. 2 Awg or smaller copper wire services. For services larger than No. 2, use conductors and fittings of like types, but increase sizes as necessary to comply with Fire Underwriters' requirements.

D. Connector Location: The bi-metal connector must be installed above the water pipe to prevent condensed water vapor flowing along the tap from the clamp to the connector.

keep a hold on conductors with *Clamptops*

Conductors held in O-B Clamptops *do not slip!* Clamptops exert enough holding pressure to make the insulators and the wood cross-arm the critical members when heavy loadings come on the conductors. When you consider that typical O-B Clamptop Pintypes and Posts have cantilever strengths ranging from 2000 to 2800 pounds, you can see that the Clamptop grip must be strong indeed!

This sort of strength is important in wind-swept, snow-burdened climates, or in the southern hurricane area. Clamptops in service in these places have stood up to the worst nature has to offer, with no record of a conductor being loosened.

How long does it take to make an approved tie connection of similar strength? How many linemen *want* to make such a tie—especially a hot tie—when the simpler, safer clamptop connection can be made in a far shorter time? *Your* answers to these questions emphasize further Clamptop advantages—speed and safety.

After an experience with a field trial with O-B Clamptops, we're sure you'll say, "Clamptops go on the Standards List—*today!*"

INVEST IN SERVICE CONTINUITY WITH Ohio Brass **INSULATORS**

MANSFIELD OHIO, U. S. A.

In Canada: Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

lineman, Spare that Wire!

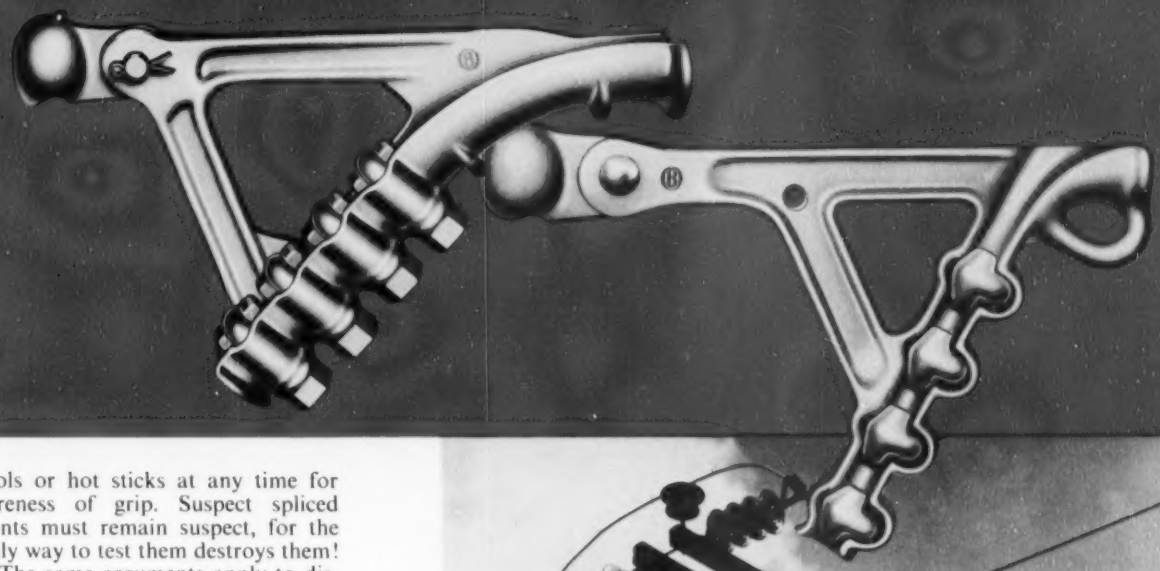
don't cut it ...loop it!

Cutting a conductor in two at every strain and dead-end is an extravagance. It takes time, costs money, and reduces conductor conductivity, and "cut and splice" methods do not have lasting holding power.

Transmission line continuous jumper loops built with O-B Hardware are completed in minutes instead of the hours required for cable-cutting methods. Strength of the cable is unimpaired. Conductivity, ditto. Holding power of the strain clamps, developed by spiral snubbing action, exceeds the maximum design tensions usually employed with ACSR, all-aluminum, or copper conductor.

Three metal compositions used for O-B Strain Clamps permit matching of cable and clamp metal, with an important reduction in electrolytic corrosion as the benefit. The non-ferrous clamps offer the additional bonus of power savings from their non-heating characteristics.

Another big point: O-B Strain Clamps can be checked with hand

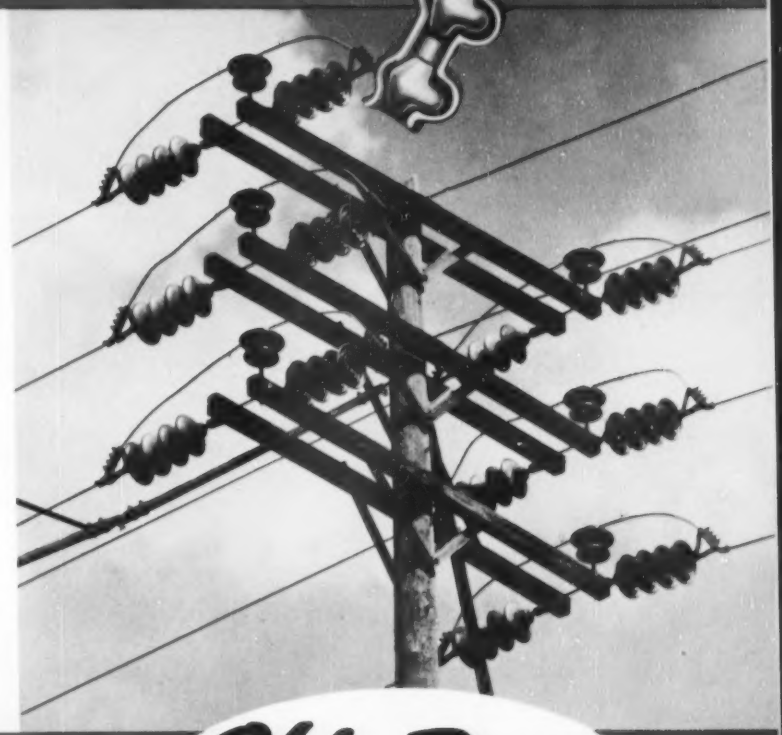


tools or hot sticks at any time for sureness of grip. Suspect spliced joints must remain suspect, for the only way to test them destroys them!

The same arguments apply to distribution construction. Continuous Jumper Loops, with O-B Hardware, are actually cheaper to build in both time and material than those requiring splicing. O-B clamps develop full working loads without conductor slip. A full-strength anchorage can be completed in a few minutes, requiring no more field equipment than a common hand wrench and no special skill. Best of all, uncut cable retains full strength and conductivity.

Hardware shown here handles all manner of distribution work at strain and dead-end points. One of the styles will suit—will probably improve, as a matter of fact—your distribution building methods!

And so we repeat—don't cut your conductor in two; loop it instead, and spare yourself considerable time and expense!



Ohio Brass

MANSFIELD OHIO, U. S. A.

In Canada: Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

one or a thousand!

Quantity is no bar to doing business with Graybar. Whether you need one O-B six-inch suspension insulator or a thousand, your order to Graybar gets quick attention—and you get quick delivery!

Ohio Brass and Graybar work together to maintain a reputation for quick delivery. Stocks at over 100 Graybar houses are set at adequate levels for day-to-day business; larger orders get direct shipment from Ohio Brass to the point you designate. Further, we make it a fetish to see that Graybar stocks are maintained, and that we have supplies on hand at the factories as well.

Thus your order to Graybar for Ohio Brass Distribution Materials is seldom (if ever) held up because of low stocks. If you come to the will call desk for "just one," if Graybar is to deliver a hundred, or if a thousand are sent from Ohio Brass, you can depend on prompt delivery!

Ohio Brass
MANSFIELD OHIO, U. S. A.

4428-H

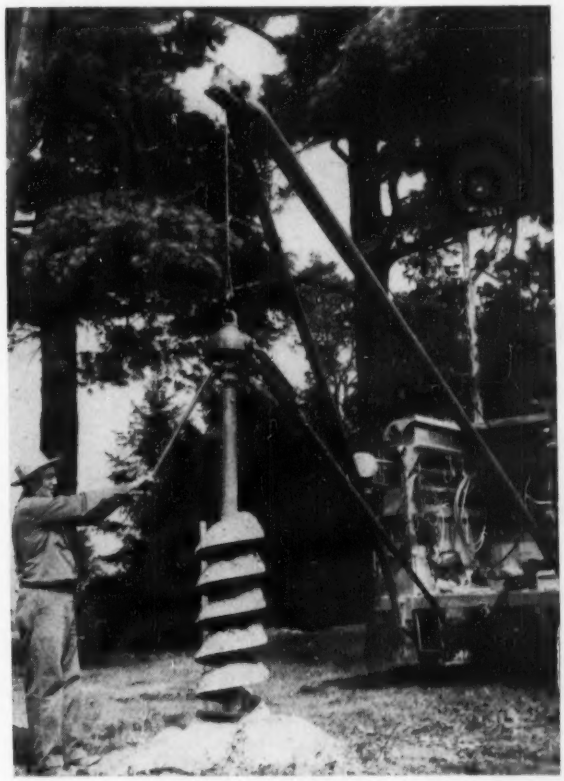
Standards

(*Continued from page* 136)

The zero left chart contains 10 major divisions and 100 minor divisions. It is calibrated from zero to unity with each major division on the chart scale printed in tenths (full scale). All zero center charts have 10 major divisions and 100 minor divisions from extreme left to extreme right. Each major division has its value printed in steps of 0.2 each from zero to unity from either end of the chart. No "zero offset" charts are used.

Each chart has its time axis printed in hours and its power axis in tenths with a unity full scale reading. Chart scale is about 10 in. wide. Chart speed is 3 in. per hour. For a chart in service on a recording instrument, the reading in megawatts is obtained from the large indicating scale on the same instrument. Each chart is rubber stamped at each end when it is inserted and removed.

Location, circuit, multiplier, instrument number, and date inserted and removed are noted for future reference. Chart full scale is always the same as the multiplier. A template calibrated with the correct megawatt scale is provided for each recorder chart to save time and effort in studying a chart after its removal.



LIGHT-DUTY HOLE DIGGER proves successful for the small jobs

Light-Duty Digger For Small Jobs

Dayton Power & Light Co is using a light-duty hole digger that is driven by the truck engine, off the truck transmission. Weight and cost are such that it can be used on smaller jobs in remote territory where sending a conventional heavy digger cannot be justified. It is carried on the truck. For big jobs, the conventional digger with its own power is considered faster and more satisfactory.

The light duty digger is suspended from the truck's A-frame. With this arrangement it is possible to reach beyond ditches to dig holes where access with a conventional digger may be difficult if not impossible. The new digger has been in use several months and has proved so successful that two more units have been ordered.

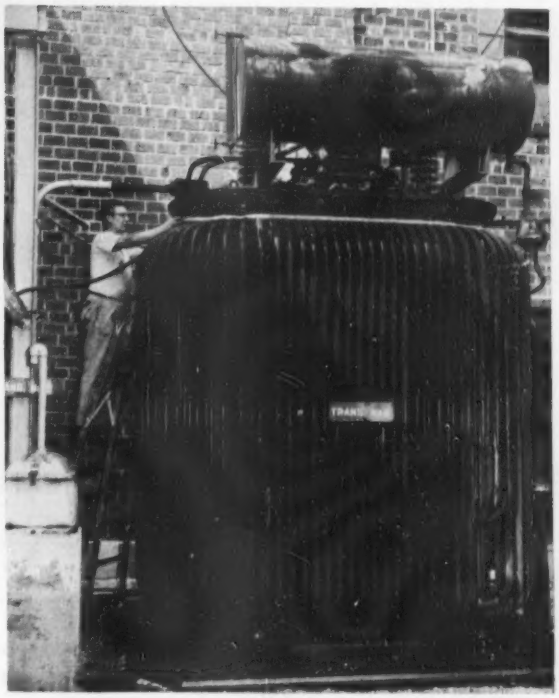
Soil Soakers Cool Transformers

Soil soakers used by Union Electric Co of Missouri reduced the operating temperatures of substation transformers to safe limits during hot summer weather. In addition, soakers permitted transformers to carry substantial overloads at normal ambient temperatures.

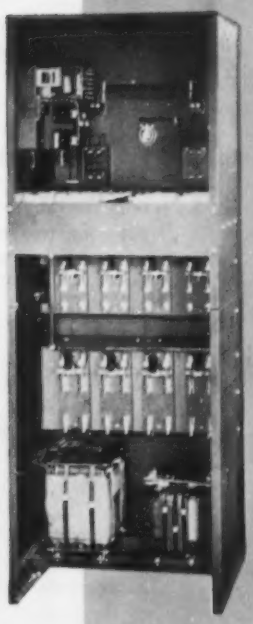
Soil soakers, made of canvas, were installed around the top of transformers and connected to a water supply. Water that oozed through the soakers' porous walls ran down over the transformers and cooled them.

Seven soakers were used to cool large substation transformers during hot summer months after an experimental installation proved effective. Three were installed on

(*Continued on page* 146)



SOIL-SOAKERS, ordinary canvas hose used for soaking lawns, were installed on seven substation transformers to permit overloading



Specify

INET

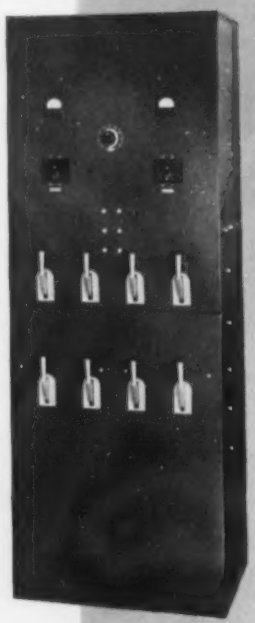
REGULATED

BATTERY CHARGERS

for EFFICIENCY and ECONOMY

Compact, centralized construction incorporating selenium rectifiers and magnetic amplifier controls. One complete unit with static elements provides highly-efficient, maintenance-free, long-life, economical operation.

"Proof-tested" regulated battery chargers with completely automatic overload protection, maintain constant voltage output regardless of A.C. line variations or load fluctuations.



CHARACTERISTICS

A.C. INPUT: 110 or 220 volts, 50 or 60 cycles, single phase. Also 220 or 440 volts, 50 or 60 cycles, three phase.

D.C. OUTPUT: 3 to 60 cells in ratings to 50 Kw.

OUTPUT CONTROL: Automatic units float batteries at 2.15 volts and booster charge to 2.33 volts. Precise potentiometer adjustment on front panel.

VOLTAGE REGULATION: Less than ± 1% from no load to full load with ± 10% A.C. supply line variation.

Modern housings of heavy-gauge steel in panel, floor-standing or wall-mounted cabinets. Low installation cost... minimum space requirement.

Write for complete engineering specifications.

INET

DIVISION OF LEACH CORPORATION

4441 SANTA FE AVENUE, LOS ANGELES 58, CALIFORNIA

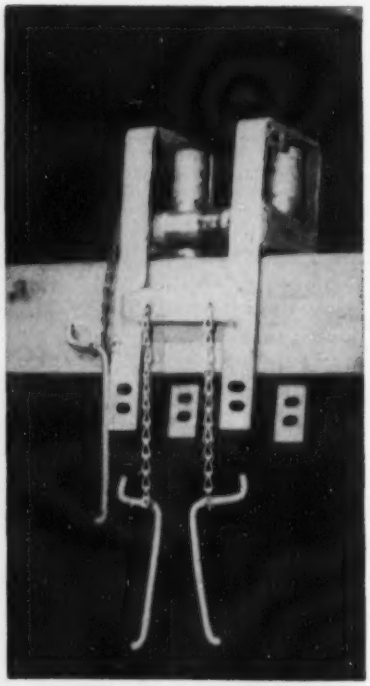
TELEPHONE LOGAN 8-4771

Soil Soakers

(*Continued from page* 145)

5,625-kva units at the company's Hi Pointe Substation and four on 7,500-kva units at Page Substation.

Cooling effectiveness of the soakers was carefully checked and recorded. Temperature of one transformer was reduced as much as 10F in two hours.



CROSSARM ROLLER reduces friction of conductor on the arm during pulling operations. Holes in lower legs are for two sizes of arms

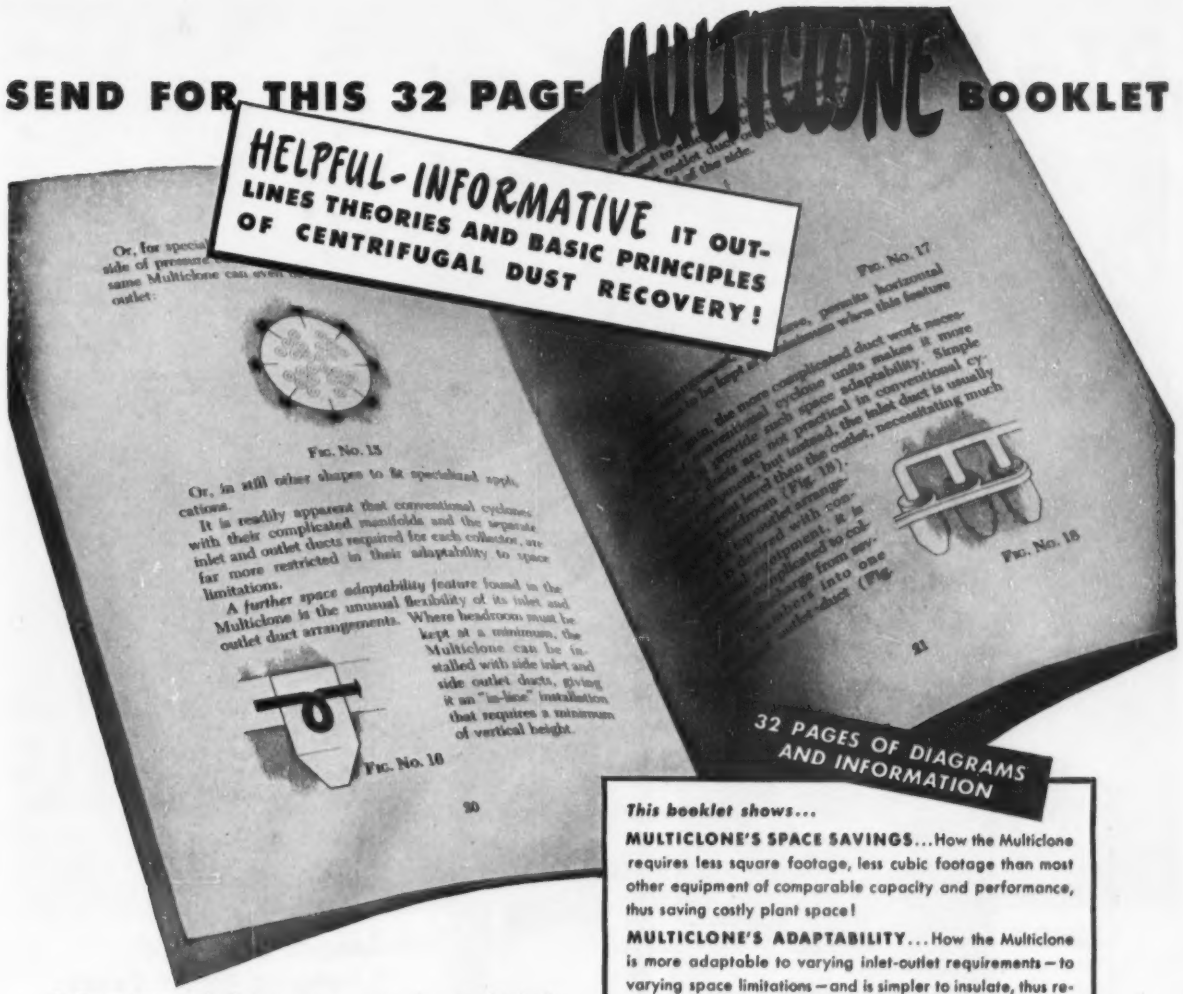
Crossarm Roller Aids Wire Pulling

Friction has been reduced and and greater safety provided in wire and rope pulling operations by a new crossarm roller developed by the Distribution Dept of Dallas Power & Light Co. Rollers are used when pulling in No. 2 and larger MHD bare copper conductors and are mounted on the crossarm, one per phase per arm. Pulling rope is threaded through the rollers, and the conductor is pulled in with the rope.

The device is of all-welded construction, is cadmium plated to prevent rusting, weighs approximately 11 pounds, and has three rollers. Rope or wire normally rests on the hori-

SEND FOR THIS 32 PAGE MULTICLONE BOOKLET

HELPFUL-INFORMATIVE IT OUTLINES THEORIES AND BASIC PRINCIPLES OF CENTRIFUGAL DUST RECOVERY!



NO MATTER whether you are now using mechanical dust recovery equipment or are planning the installation of such equipment at some future date, here is a booklet that is full of helpful and valuable information on centrifugal dust recovery. It not only explains the basic methods and principles involved, but also shows the important differences between small and large diameter separating tubes, shows how to simplify your duct work and reduce installation costs, and outlines many other important factors to be considered in selecting mechanical dust recovery equipment.

In addition, this informative booklet illustrates and explains how MULTICLONE'S unique *vane* design is fundamentally different...how it makes possible greater compactness, simpler installation, high recovery of the small particles as well as the medium and coarser ones, and many other facts on MULTICLONE advanced design.

A limited supply of these booklets is available for free distribution to those interested in mechanical recovery equipment and methods. Write for your copy today.

This booklet shows...

MULTICLONE'S SPACE SAVINGS...How the Multiclone requires less square footage, less cubic footage than most other equipment of comparable capacity and performance, thus saving costly plant space!

MULTICLONE'S ADAPTABILITY...How the Multiclone is more adaptable to varying inlet-outlet requirements—to varying space limitations—and is simpler to insulate, thus reducing installation costs!

MULTICLONE'S EFFICIENCY...How Multiclone's multiple *small diameter* tubes, made possible by its exclusive vane design, give higher centrifugal forces and more complete cleansing of *all* suspended particles—even small ones of 10 microns and less!

MULTICLONE'S LOW MAINTENANCE...How the Multiclone has no high speed moving parts to repair or replace, no pads or filters to clean or renew, nothing to choke gas flow or increase draft losses as suspended materials are recovered. Multiclone draft losses remain uniformly low—recovery efficiencies uniformly high—at all times!

Make sure that a copy of this helpful booklet is in your reference files by sending for your copy now!

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...in all parts of the U. S. A. and foreign countries.

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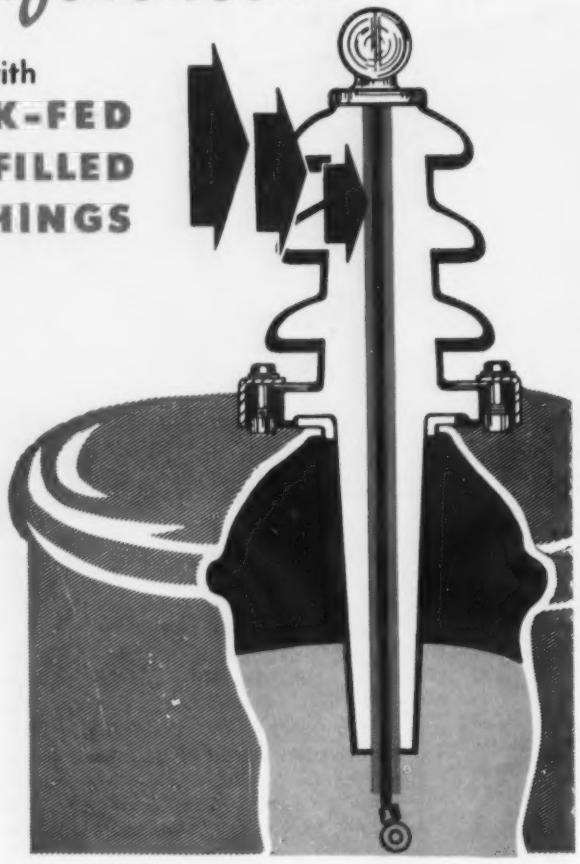
RT & E *transformers are free from radio interference...*

with
WICK-FED OIL-FILLED BUSHINGS



Radio and television interference has existed in distribution transformers, due to corona inside the high voltage bushing. This corona and interference effect has been eliminated in R T & E transformers by the use of fiber glass filled bushings which extend into the transformer oil and provide wick-fed oil-filled bushings.

R T & E transformers are radio and television interference free even at 120% of rated voltage.

R T & E transformers have many other exclusive design advances that will save you time and money.

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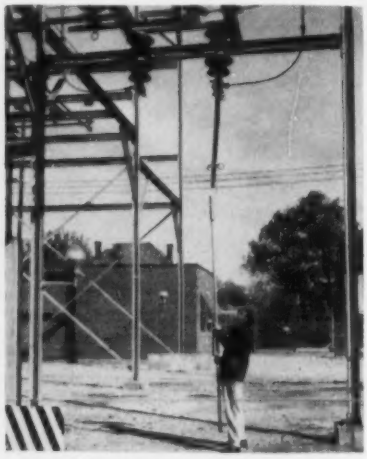
zontal roller, and rollers on each side reduce friction when there is side pull in either direction. A pin goes across the top and locks in place to keep the wire in position.

The new roller: Provides greater safety by keeping the wire in position when pulling near energized lines, reduces strain on the pulling rope and winch and also reduces wear on the pulling rope, and prevents wire from cutting into the crossarm.



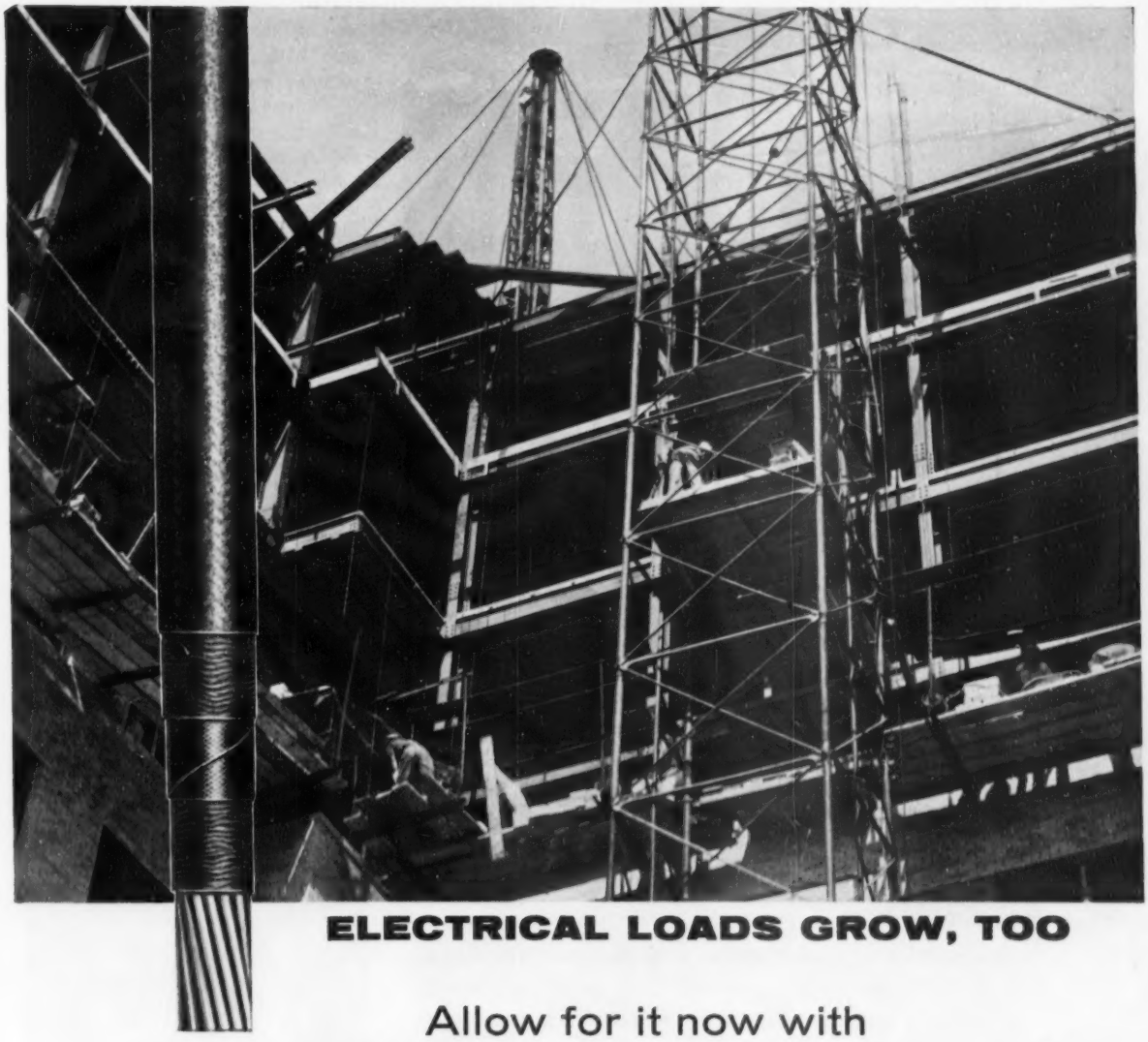
SPECIAL HOT STICK, eight ft long and 1½ in. diameter has cup 10 in. long and with 1¾ in. inside diameter

Special Stick Aids Changing 69-Kv Fuses

W. A. REY, General Foreman, General Repair Shops, Oklahoma Gas & Electric Co, Oklahoma City

Problem of changing fuses on 69-kv circuits in outlying areas was solved by Oklahoma Gas & Electric Co's operating men when they made a special fusing stick. Fuses weigh seventeen pounds and are mounted fifteen feet above ground level as measured to the hinged end of the fuse. Previously, the practice had been to provide a fusing platform from which one man could change out a blown fuse. With the development of the special fusing stick, the cost of the fusing platform was saved and the job of replacing fuses made much safer.

Fuse holders are approximately four ft long and two in. in diam but have a short section of reduced diameter at the top. The special fusing stick was fitted with a metal end section which fits over the reduced sec-



ELECTRICAL LOADS GROW, TOO

Allow for it now with

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WIRE AND CABLE (N. E. C. TYPE AVA)

Plan for future load growth in the blue print stage. Specify Rockbestos A.V.C. instead of RH size for size and you will get up to 30 to 50% more current capacity as your plant grows and needs it.

For example, anticipated demands for a circuit calls for a 430 ampere load at 40°C ambient. To use RH, 800 MCM cable is required. But by using the same size Rockbestos A.V.C. cable instead of RH you not only meet the requirements but automatically wire in 564 amperes . . . giving you 133 amperes more current for future load demands.

Constructed of a specially impregnated asbestos and a high dielectric varnished cambric tape, it's practically indestructible. Assures a lifetime of dependable service.

Get the complete story, call in your Rockbestos representative or field engineer. He's a wire specialist who can save you time and money.

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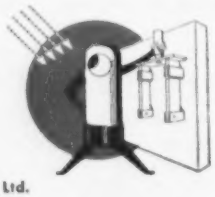
OAKLAND, CALIFORNIA • SEATTLE

The new Fisher-Pierce Series 64400 Photoelectric Control is a small, compact, lightweight 575 watt unit readily adapted to a great many mounting requirements. Appropriate accessories are available for mounting on luminaire, wood pole or cross arm, ballast, pole top, standard, mast arms, etc.

Because of its low initial cost as well as savings in wiring, other materials, and labor, it is economically feasible to use one F-P 64400 Control per lamp.

The control employs the well-known Fisher-Pierce basic circuit which has been proven by the experience of hundreds of utilities in thousands of installations. Such design improvements as etched circuitry have permitted low unit cost without sacrifice of high quality.

WRITE FOR DESCRIPTIVE LITERATURE



The FISHER-PIERCE CO., Inc.
82 Pearl St., So. Braintree, Boston 85, Mass.

EXPORT: PHILIPS EXPORT CORP. 100 E. 42nd STREET NEW YORK 17, N.Y.

IN CANADA: NORTHERN ELECTRIC CO., Ltd.

tion of the fuse holder. When the fuse blows, the fuse holder swings into the inverted position.

The cup section of the fusing stick is slipped over the reduced diameter section of the fuse holder, and the holder is easily lifted from position by one man. The lower end of the fusing stick is then held against a wall or something to keep it from slipping as the man walks away lowering the fuse holder as he goes.

After the fuse is changed, the steps are reversed returning the holder to position.

Hot Sticks Stored Easily in High Bins

A pole fitted with a clothes line by Oklahoma Gas & Electric Co eliminates climbing a step ladder to store or remove hot sticks from high storage bins.

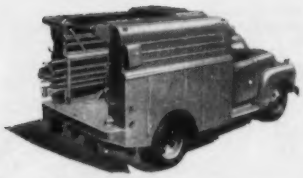
The device consists of a 1½-in. pole, 6 ft long, with a hole drilled

in one end. A piece of clothes line was inserted through the hole and stapled to the back of the pole. Remaining length of line was threaded through three staples along the front of the pole.

When used, a loop is formed in the line at the hole end of the pole and is placed around the hot stick. Thus, a man can easily handle hot sticks while standing on the floor.

Using the device for some time has proved that no damage is caused to the hot sticks and considerable time has been saved.

UTILITY WORKHORSE-



LINE CONSTRUCTION BODY (500)
Medium and heavy duty work. Vertical compartments are optional . . . can be equipped to fit individual needs.

REVOLVING AERIAL LADDER
Models available in working heights of 23′ 6″, 26′ 6″, 30′ 6″, and 32′ 6″ for all styles of bodies.

LIGHT DUTY MAINTENANCE BODY (350)
Fold-over type derrick will handle poles up to 40′ in length. 24′ ladder extends from rear of body.

HYDRAULIC TOWER
Available in sizes from 21′ to 30′. Platform revolves full 360°. Tower can be operated from cab or platform.

There are many styles of *Powers-American* Bodies not shown here. Write for descriptive catalog today.

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All *Powers-American* bodies have *earned* the reputation of "workhorse" of the utility industry by years of faithful performance. No matter how tough the job or the operating conditions, they pull more than their share of the load by stepping up crew efficiency and lowering operating costs. Whatever your utility body needs, *Powers-American* is your *1* source for *all types* of utility bodies and equipment. Write today for more information. Put a *Powers-American* "workhorse" on your job and watch the team pull ahead!

"The Accepted Standard with Utilities Everywhere"

LINE CONSTRUCTION BODY (600)
Completely equipped to carry all tools and materials needed for line work. Can be furnished with winch and derrick, compressor, digger, or any special equipment required . . . for use in any phase of the utility industry. Available in 9′ to 14′ lengths, with or without built-in crew compartment.

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PUBLIC UTILITY BODIES AND EQUIPMENT
McCABE-POWERS AUTO BODY COMPANY
5901 North Broadway, Saint Louis 15, Missouri

PRODUCING STEEL in 16,000-kva (max. load ½-hr period) electric furnace cuts costs more than $3.00 per ton and improves quality over open hearth method. Consumption is about 5 million kwhr per month

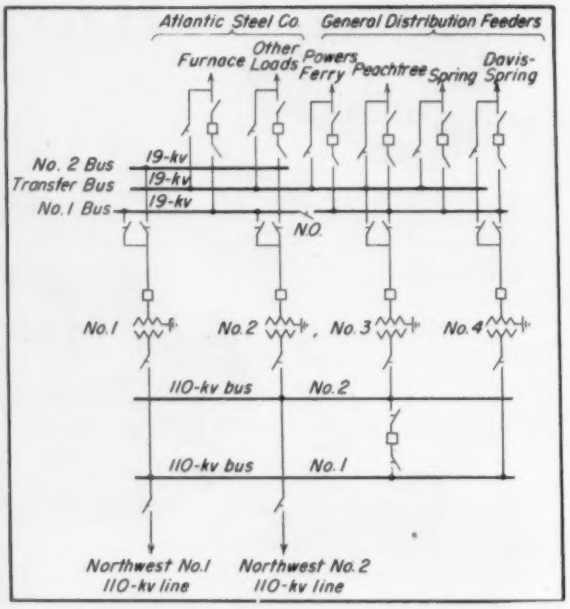


DIAGRAM of Georgia Power Company's new Northside Drive 110/19-kv Substation. Note that arc furnace is connected to separate transformers for maximum flicker reduction. For other details see story

Electric Furnace Cuts Costs

R. O. LOOMIS, Planning Engineer, Georgia Power Co, Atlanta, Ga.

Producing steel at an average rate of 10,000 tons per month in electric arc furnace at Atlantic Steel Co, Atlanta, Ga., cuts cost of ingots $3.00 or more per ton compared with same grade steel ingots by open hearth furnace. Advantages of electric furnace over open hearth are: greater availability for charging (94% vs 88%); speed in making steel (76-ton electric furnace heat can be tapped every 5 hr compared with 80-ton heat every 9½ hr with open hearth); refractory material costs only one-third that of open hearth and higher quality steel is produced with electric furnace. The electric furnace uses 100% scrap, while open hearth requires 25% pig and 75% scrap per charge. In spite of scrap contamination, electric furnace yields 4% more steel out of material than does open hearth, which loses some of its steel in slag.

Substation . . . To serve this important power load, Georgia Power Co constructed a new 110/19-kv substation, which also serves the general distribution loads in the area. The new Northside Drive substation, adjacent to Atlantic Steel, is supplied by two 110-kv lines about 2.6-mile long from the Northwest 110/19-kv substation. The new substation consists of four 12,000/20,000-kva, 110/19-kv transformers, one 110-kv bus tie breaker, and ten 19-kv oil circuit breakers. Four of these 19-kv breakers are used as low side bank breakers and the other six 19-kv breakers used as feeder breakers. Two transformers are connected to each 110-kv bus so that service can be maintained with either 110-kv line out of service.

The arrangement is shown in the line diagram. Transformer #1 is connected only to the arc furnace and #2 to the other loads of Atlantic Steel Co. Transformers #3 and #4 are connected to supply Georgia Power's 19-kv overhead system.

Voltage Flicker . . . The volage flicker caused by the arc furnace is reduced to values acceptable to the general distribution load by the following methods:

1) The 19-kv bus supplying the arc furnace is separated from the 19-kv bus supplying the remaining loads.

2) The furnace was designed with an overall impedance from ac to 19-kv bus of 40% on 15-Mva base.

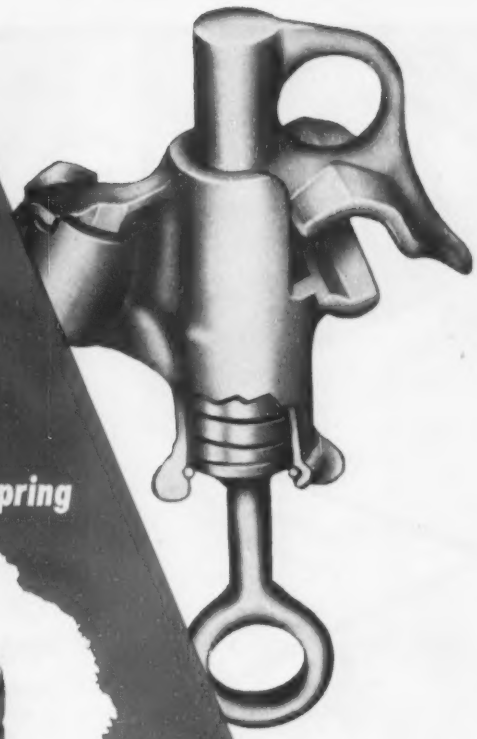
3) The two Atlantic Steel 12,000/20,000-kva transformers have an impedance of 8% on their self-cooled rating of 12,000-kva which is higher than transformers supplying the general distribution load.

4) The source of power for the furnace is dependable since it is a double-circuit, 110-kv line from a 240-Mw plant about 7 miles away.

5) The 19-kv lines used for general distribution are all operated as a network with other 110/19-kv substations. This means that the 19-kv lines connected to the 19-kv bus of Northside Drive substation, feed into the bus in event of a bus fault. They do the same in case of flicker, hence this 19-kv bus has less flicker than the 110-kv bus in the same station.

By these means, the voltage variation on the 110-kv bus is held to values not exceeding about 1.5% with a somewhat smaller variation on the 19-kv bus supplying general distribution load.

FARGO HOT LINE CLAMPS



Built with a Heavy-Duty Spring

to Assure Constant Pressure

FARGO'S
four "AGE" Series
HOT LINE CLAMPS
all have well-protected, husky, vanadium steel springs. The stress annealed, cronak finished spring compensates for variables caused by fault currents and the "flow" of conductors.

Quality controlled castings have low contact resistance and excellent current carrying capacity. Jaws are designed for maximum strand contact which reduces heating by greater conductor encirclement and better current distribution.

* * *

Available in plated aluminum or bronze for all purpose use or aluminum or bronze for "like metal" contacts.

The four clamps cover a range of run conductor sizes from 8 sol. thru 2,000,000 CM Al.

Ask your Line Material Field Engineer for complete details.

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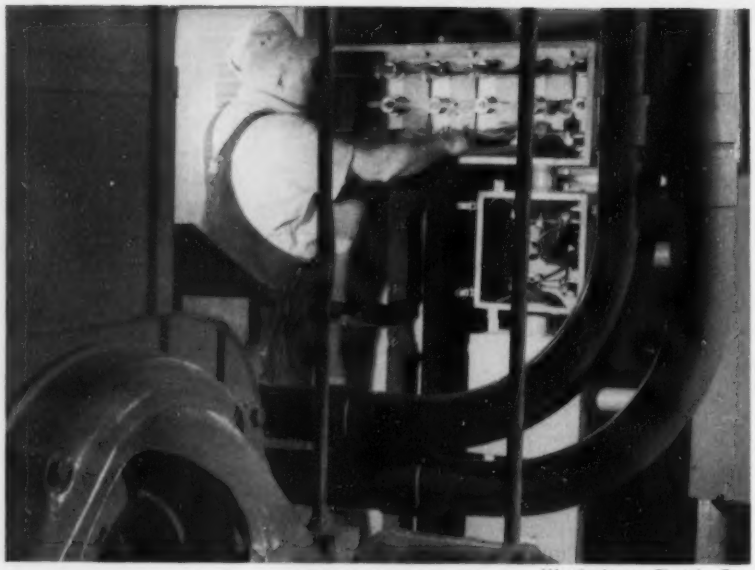
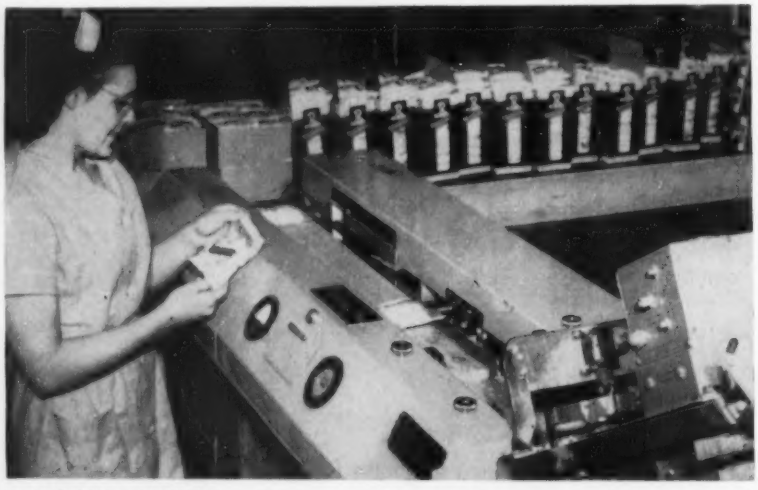


Westinghouse Electric Corp

Capacitors Solve Motor Starting Problem

A capacitor installation recently solved a motor-starting problem when a 400-hp, 220-v synchronous motor was substituted for two 200-hp motors in the air-conditioning system of Kaufmann's Department Store, Pittsburgh, Pa. Heavy starting current drawn by the larger motor caused a 22% voltage drop and prevented the motor from locking into synchronism. The problem was solved with a 135-kvar, 3-phase, 230-v capacitor bank, installed near the motor. The starting voltage drop was reduced to 13%, and a more expensive and time-consuming rewiring job was eliminated.

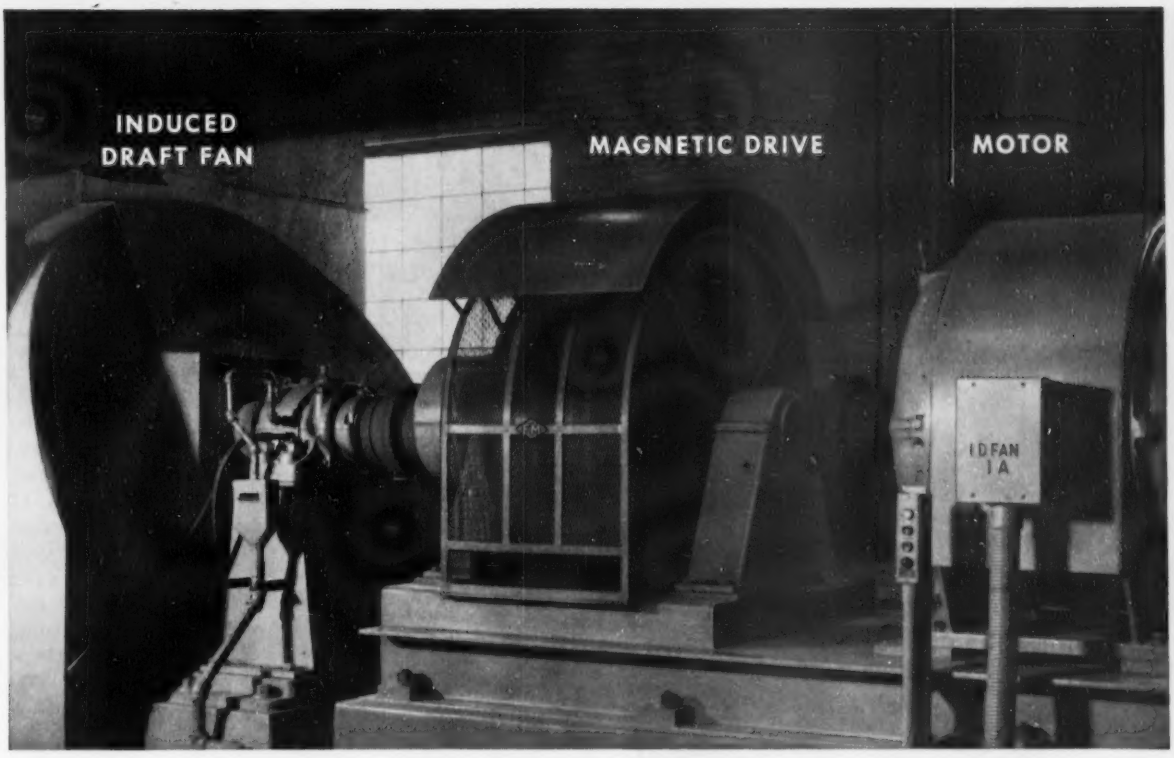


ELECTRONIC CONTROLS automatically watch weights of candy packages up to 90 per minute. Over and underweights are rejected while proper weights are passed

Electronics Check Candy Weight

L. **ALBERTSON,** Application Engineer, Philadelphia Electric Co, Philadelphia, Pa.

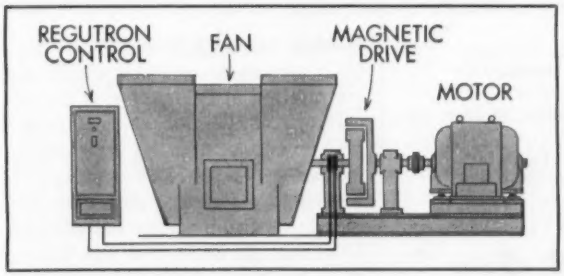
Electronic controls perform an operation of special interest for Thomas D. Richardson Co, candy manufacturer, Philadelphia, Pa. An electronic machine with a sensitive floating belt scale checks weights of packages of candy after filling. Over-



Now 18 E-M Magnetic Drives for Potomac Electric Power Company

● The clean, compact E-M Magnetic Drive above gives adjustable speed for an induced draft fan at the Potomac Electric Power Company Buzzard Point plant, Washington, D.C. This Drive is rated at 550 hp, 850/90 rpm. The first Magnetic Drives were installed by this large, rapidly growing utility in 1941.

These E-M Magnetic Drives transmit torque electromagnetically from constant-speed a-c drive motors to vary the speed of the fans. The Magnetic Drive responds precisely to the speed dictated by the automatic combustion control.



E-M MAGNETIC DRIVE SYSTEM for induced draft fan speed control consists of a constant-speed motor, the Magnetic Drive, and the E-M "Regutron" Speed Control. Operating speed of the "magnet" coupled to the fan shaft is held at the desired value by the "Regutron" which supplies d-c excitation to the "magnet" in accordance with the demands of the combustion control system.

Among the advantages of Magnetic Drive speed control you will find:

1. **Savings in Driving Power.** Because fan operating speed is no more than required, drive power is used most sparingly.
2. **Reduced Blade Erosion.** When boiler load is reduced and fan speed is reduced accordingly, "sand blasting" effect on the blades by airborne particles is reduced to a minimum.
3. **Precise Control of Air Flow.** The E-M Magnetic Drive maintains fan speed to within plus or minus *one-half percent!*
4. **Easy and Economical Maintenance.** The Drive and its control contain few moving parts. It is simple to understand and requires little maintenance. No auxiliary cooling equipment needed.

Ask your nearest E-M sales engineer for more facts and figures on this simple, economical method of driving draft fans. And write the factory for E-M Publication No. 1107 containing pictures and data on typical Magnetic Drive applications.

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

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Magnetic Drives **MAKE DRAFT FANS DO EXACTLY WHAT YOU WANT THEM TO**

The Old Reliable!

for greater strength

RUGGED
DURABLE
DEPENDABLE

Porcelain Products wireholders and secondary service materials are built to pace-setting standards that *mean* reliability!

STRONG, STURDY CONSTRUCTION—for customer satisfaction.

METAL in TENSION—PORCELAIN in COMPRESSION—a feature so many contractors like.

HOT-DIP GALVANIZED steel parts, including the screw, for durability.

EXTRA SHARP SCREW THREAD—LUBRICATED reduces torque required to turn screw, makes fast, easy driving.

SCREW-SHANK HEAVIEST at base for maximum strength where load is most critical.

LARGER, PULLEY-ACTION WIRE HOLE—for easy installation of large wire sizes and to eliminate damage to insulation.

SCREW LENGTHS—2¼ inch and 3 inch standard stock items.

QUALITY—the name PORCELAIN PRODUCTS today, as for generations, is a by-word for quality, dependability and fair dealing.

See your distributor for complete details.

ELECTRICAL PORCELAIN SINCE 1894

60 years

Porcelain Products, Inc.

PP —INC—

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weights and underweights are rejected. Packages of proper weight are passed for shipment to customers. Operation is completely automatic, requires no attention, and machine will check weight of up to 90 packages per minute, a speed which has proved to be satisfactory.

INDUSTRIAL BRIEFS

Uniform and shadowless light from a ceiling grid of 14-ft squares at Skinner Chuck Co, Berlin, Conn., provides intensity of 60 ft-c at machine and bench levels in an 85,000-sq ft factory. Fixture mounting height is 15 ft. Ventilating slots in fixtures reduce dust deposits and lessen maintenance costs. Upward component of light is reflected from flat-white painted ceiling, heating, plumbing and ventilating ducts, conduit and structual members. Office desks have 100 ft-c. Total lighting load of 276 kw calls for 3.25 w per sq ft.

Melting aluminum with two 60-kw electric furnaces at the Acme Aluminum Co plant, Dayton, Ohio, has reduced the porosity of the finished product to meet government specifications. They have eliminated flux and dross in the operation. Thermostatic control is better with the electric furnaces than was possible with gas fired furnaces, formerly used. The electric furnaces also eliminate waste heat in the melting room which was an important factor in the decision to make the installation. Temperature of the metal is brought up to 1350 F in preparation for molding. T. E. Bennett, Power Sales Engineer, Dayton Power & Light Co.

Heating chemicals with infrared radiant heaters in the barrels in which they are received at Pedlow Nease Chemical Co, Mill Hall, Pa., saves 100 manhours monthly. Heating expedites removal of contents and improves efficiency of mixing operations. Method is safe, adaptable, clean and efficient. Low wattage density of the heating units minimize danger of explosion. 18 kw in infrared units are mounted on special frames curved to follow contour of the barrels. Kenneth H. Breon, Industrial Sales Representative, Pennsylvania Power & Light Co, Williamsport, Pa.

4 reasons why G-E vertical-lift design is best for metal-clad switchgear

1 Allows you to see breaker disconnect

With General Electric's vertical-lift breaker, you can actually *see* that the circuit breaker is disconnected. You don't need to depend on an indicator and when the breaker is disconnected, mechanically operated shutters in metal-clad switchgear automatically close off these stationary disconnect openings to protect the operator.

2 Simple to inspect and maintain

While G-E breaker is still in the compartment, you can make most check tests and even perform some maintenance. Although removal of breaker element is relatively easy, inspection in the compartment saves considerable time and effort.

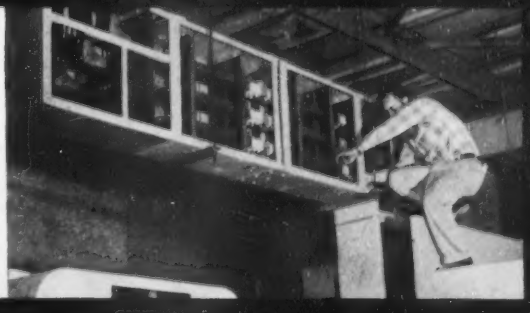
3 Saves time and energy

In G.E.'s vertical lift design air circuit breakers rated 100 MVA and larger are lowered and raised effortlessly by a simple, fast-acting elevating mechanism, consisting of two jack screws and a sturdy, compact gear-motor. You do away with jacking and cranking. Just set switch for "raise" or "lower" and hold clutch lever forward until breaker is in position.

4 Assures maximum safety

When you need to work on a feeder, you want to be sure that the breaker is disconnected. With G-E vertical lift, you can lower breaker until you *see* contacts disconnect, padlock the mechanism so breaker cannot be raised, and close compartment door. You can then work without fear that someone will carelessly close the breaker and energize the feeder.

General Electric Company, Schenectady 5, N. Y. 511-1



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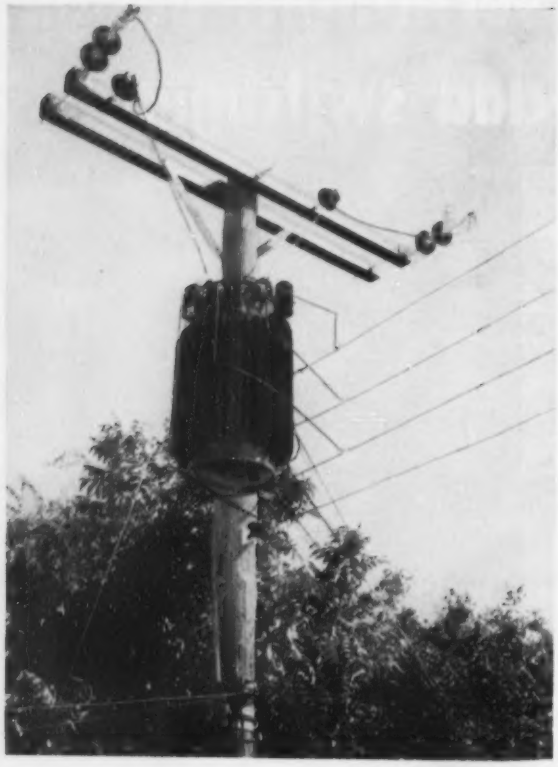


One/Three-Phase Transformer

Distribution transformer with two dissimilar windings provides 3-phase and single-phase service for residential areas. CSP duplex transformers are arranged for open-star primary and open-delta secondary connections. Three-phase bimetal breaker is connected to give full protection for both single phase and three phase and for any combination of the two loads.

Transformers can be built for different combinations of ratings. Common windings are a 25 kva and a 5 kva, which can supply 8.66 kva 3 phase and 25 kva single phase, or a limited combination of these. Size of duplex is slightly greater than a single-phase, 25-kva transformer.
Westinghouse Electric Corp, 401 Liberty Ave, Box 2278, Pittsburgh 30, Pa.

Unit-Supported Bus

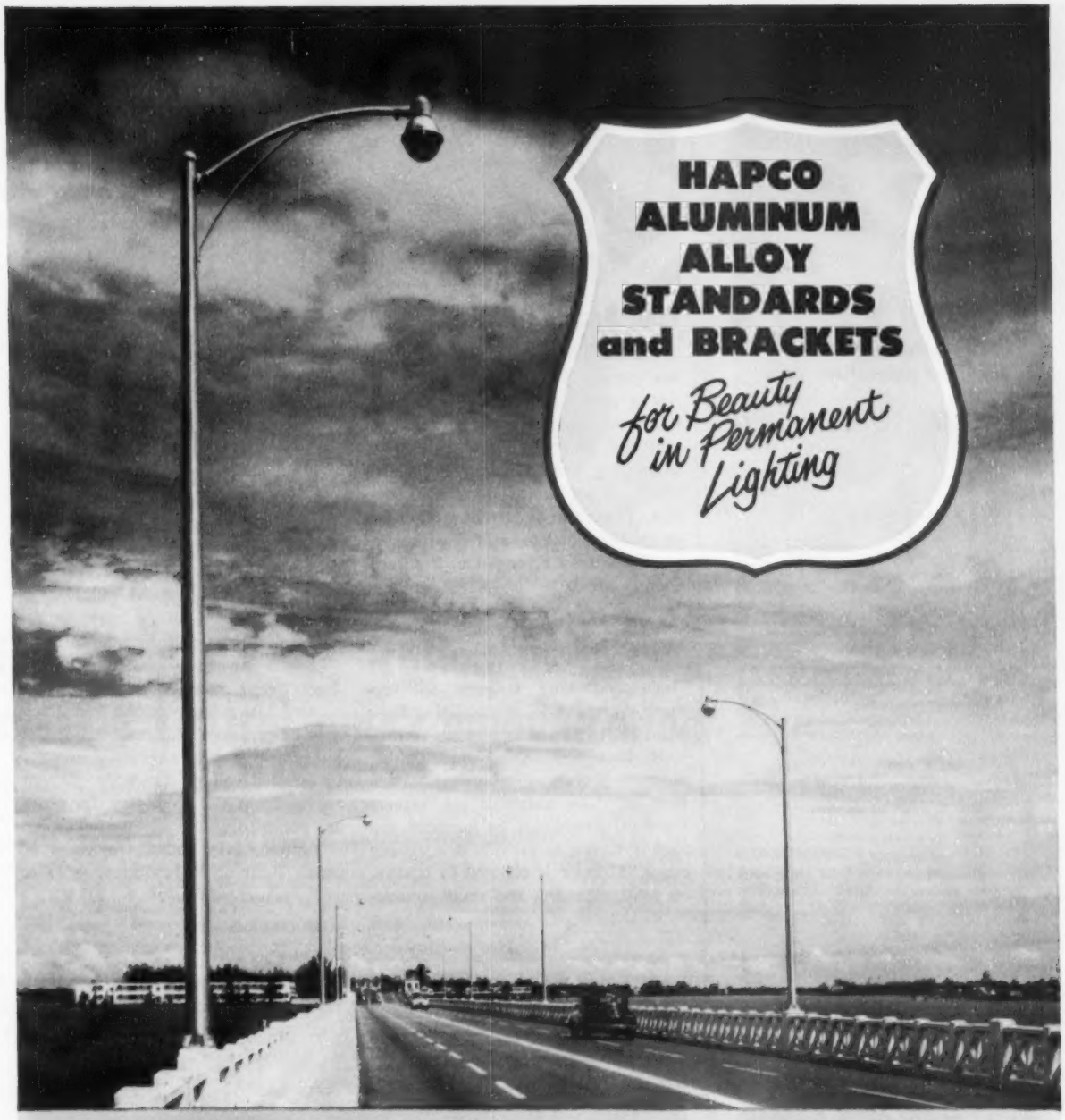
Unit-supported bus is usable for direct connection of generators and main power transformers in a unit generation system. Bus is of isolated-phase design and will withstand high short-circuit currents.

Bus has single insulator supports. Metal sheath around bus is said to keep lines of force from acting between conductors—zero force exists at center of enclosure. End bells are welded in place. Bus is available in lengths up to 16 ft, 3-phase sections, and in ratings up to 10,000 amp, 14.4 to 34.5 kv.
General Electric Co, 1 River Rd, Schenectady 5, N. Y.

Straight-Line Clamp

A straight-line clamp, Pinco L4491FA, has a clamp body of drop-forged aluminum alloy and a drop-forged steel keeper with aluminum liner. Clamp will accommodate ACSR or all-aluminum conductor. Cable seat range is from 0.46 to 0.91 in. Rated ultimate strength is 15,000 lb.

Clamp is available also in drop-forged steel, No. 4491, with ultimate strength of 12,000 lb. Both have come-along eye and have either socket or clevis-type connectors.
Porcelain Insulator Corp, Lima, N. Y.



DESIGN FEATURES

- One-piece construction in all lengths to 40 ft. No longitudinal seams or transverse joints.
- Heat-treated alloys used throughout, give consistently uniform high strength.
- Designed for either overhead circuits or underground wiring.
- Venetian column type of taper acclaimed by architects.
- No forms or mandrels used to shape pole. Taper can be varied to suit individual requirements.
- Light weight cuts installation cost.
- Entire surface ground to mat finish which gives best surface for non-reflecting, durable oxide film.
- No painting needed at any time. Saves maintenance cost.

SPECIFICATIONS

Standards available up to 40 ft. in height, with Standard Base or Transformer Base.

Brackets from 3 ft. to 15 ft., in round or oval cross-section, with 1¼ in. or 2 in. slip fitter or threaded ends.

Handholes, Pole Top Pin Assemblies, Ballast Attachments, Spreader Arms, Levelites, and other accessories available.

HUBBARD ALUMINUM PRODUCTS COMPANY

MANUFACTURERS OF HAPCO QUALITY ALUMINUM PRODUCTS

A Division of HUBBARD and COMPANY

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No. 11 Pruner Head

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The very finest of tree pruners! Virtually unbreakable heads, selected spruce poles with positive locking, seamless aluminum joints. Simple, powerful action. No. 11-18, 1" capacity, $16.00. No. 12-18, complete pruner 1½" capacity, with 18 foot pole, $24.75. Extension sections available.

POLE PRUNING SAW
No. 20 SAW HEAD
Head only $4.20
with 18 ft. pole $16.00
16" needle-tooth saw blade fits in 3 different positions. Extra large hook for pulling out loose branches. Paint brush holder.

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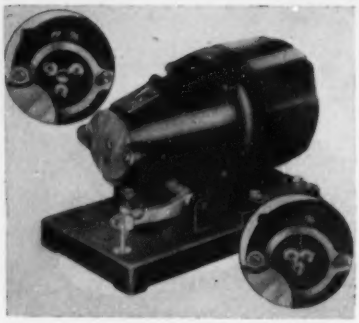
SEYMOUR SMITH & SON, INC., 42401 Main St., Oakville, Conn.

Pole Bearing Plate

Malleable-iron pole bearing plate has curved perimeter, keeping hole size a minimum. Pair of plates, installed on the pole with single through-bolt and grid gains, add 180 sq in. to bearing area. Cone effect resists uplift. Reinforcing ribs check rotation. Plates can be used at ground line on existing poles to resist down-thrust. **Malleable Iron Fittings Co, Branford, Conn.**

Wire Stripper

High-speed wire stripper will remove up to 1½ in. of insulation from wire up to ½ in. diameter. Three steel discs are angled into cutting position slightly overlapping. Pressure of discs automatically centers the wire. Discs may be loosened and slightly turned to provide new cutting edges. Stripper is claimed to operate on solid, stranded, and multi-conductor wire. Motor is ¼ hp.
High Speed Hammer Co, Inc, Rochester, N. Y.



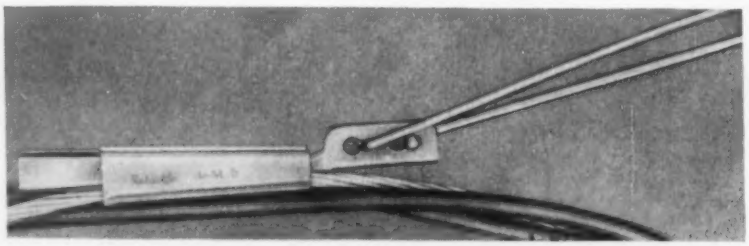
Oscillograph

Type 323 wide-band cathode-ray oscillograph features precision measurement of both time and amplitude. Direct-coupled (10 Mc at 3 db down) amplifier enables display of very low frequency or high-speed pulses. Directly calibrated sweep may be recalibrated, if needed, by internal time standard. Sweep ranges extend from 1 sec to 0.1 microsecond per inch.

Any 2 in. portion of the 4 in. trace may be expanded and examined in detail. Scale may be calibrated in volts by internal voltage standards. Eleven ranges from 0.2 to 400 v full-scale are provided.

Type 5AMP- cathode-ray tube is used. Built to tight tolerance, and

(*Continued on page* 173)



Service Wedge Clamp

Service wedge clamp permits formed 3-wire drop to be put up and sagged before cable is cut, eliminating waste from wrong cuts. Two sizes of clamps cover conductors from 1/0 ACSR to 6 solid. For use with ACSR, shell is aluminum and wedge is stainless steel. For copper or Copperweld conductors, shell is bronze.

Action of wedge tightens under load. Length of wedge and shell distributes load over long conductor surfaces. Stainless steel bail has one leg detachable and can be used with spools or knobs as well as hooks. Flexible bronze-rope bails are also available.
Reliable Electric Co, 3145 Carroll Ave, Chicago 12, Ill.

J. E. Barkle, Manager, Westinghouse Electric Utility Engineering Department.

In his 15 years with Westinghouse, Jack Barkle has been personally associated with many developments in power system communication and control. He has achieved widespread recognition for the application of these developments to individual utility problems.

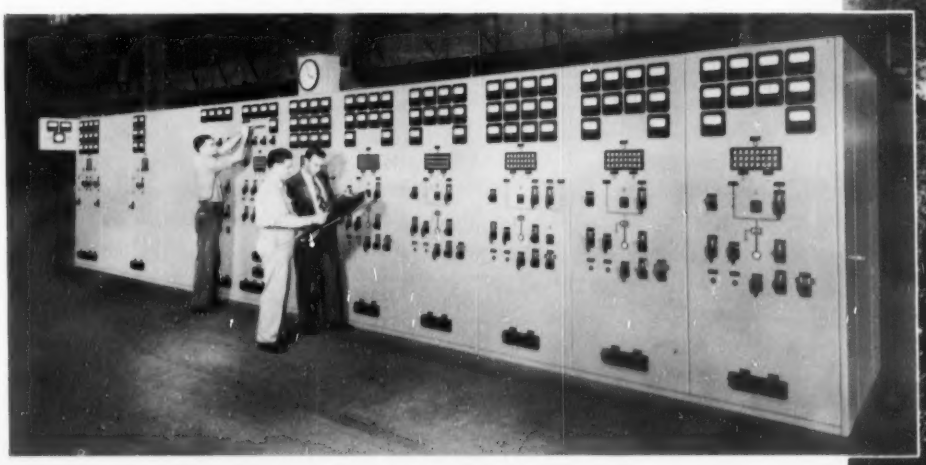
The economic application of system control and communication

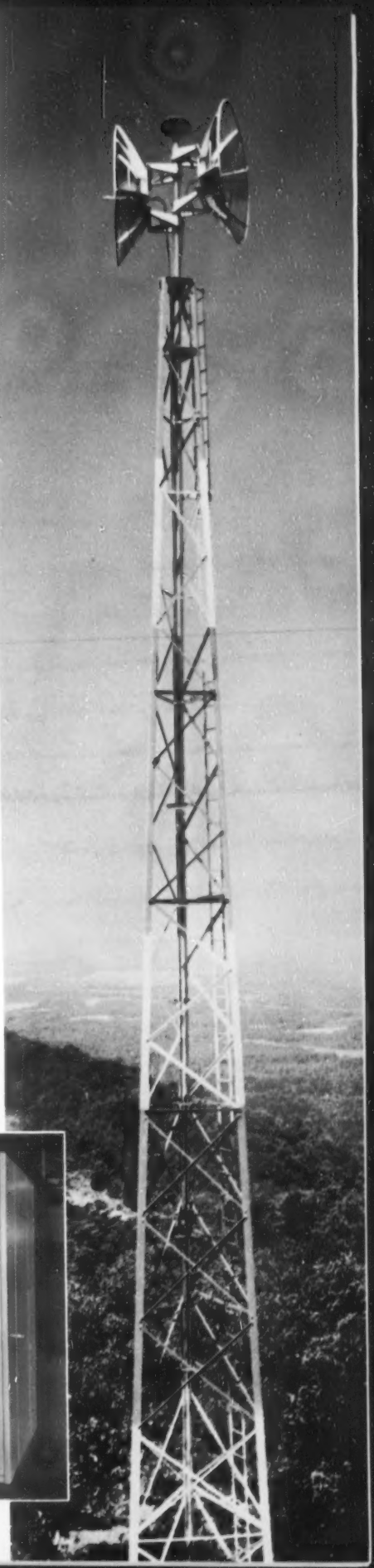
Whether your primary interest is in automatic operation, control or protection . . . or all three . . . Westinghouse is in a unique position to serve you. As a manufacturer of all types of controls, protective devices and interconnecting communications, Westinghouse has no ax to grind for any one type, except the obvious:

To assist in finding the best answer to your individual system requirements.

And in that, Westinghouse has a big stake. Westinghouse shares with you a community of interest that extends beyond individual products. All your problems, however, must be solved by the application of these products.

On the following pages, Westinghouse experts set forth the tangible benefits of products designed to work together, right from their inception on the drawing boards, to attain maximum efficiency with economy.





Westinghouse FR-FJ microwave equipment during final assembly. Bob Cheek, Assistant Engineering Manager, Electronics Division, points out FR-FJ microwave's building block construction . . . one of its many flexibility features.

Communications systems with coordinated end-use devices effectively meet every requirement

Most utilities today take advantage of power line carrier or microwave, or plan for it in their future growth. In this, Westinghouse is well-equipped to meet individual system requirements with (1) Type FD power line carrier, (2) Type FR-FJ 2000-megacycle microwave, and (3) coordinated devices for voice communications, telemetering, supervisory control, relaying, and other functions.

The basic consideration of whether carrier or microwave—*or both*—will best satisfy your individual needs is economic. Carrier costs vary greatly with the number of channels; microwave costs with distance. In general, carrier has the cost advantage for a smaller number of channels over longer lines. Conversely, microwave has the advantage for a large number of channels over relatively short distances.

Other considerations, too, are important. For example, there is a practical limit to the number of carrier

channels that can be applied to any given transmission line, regardless of the distance involved. Microwave, on the other hand, can easily provide many more channels than are needed for most applications. Also, microwave is completely independent of power lines, which means it can convey intelligence between widely dispersed locations, even though some, or all of them, are remote from the power lines.

Westinghouse FD carrier features

. . . Voltage regulation
. . . D-c operation
. . . More channels

The importance of reliability to the individual utility cannot be overstated. For that reason, all Westinghouse FD carrier assemblies include voltage regulators that automatically assure correct voltage on the tube filaments. This exclusive feature is especially important in relaying, where dependability of vacuum tube action must not be hampered by lowered line voltages. The dependability of FD voice assemblies has also been increased. These operate directly from 60- or 120-cell station batteries—the only carrier with this advantage. A-c assemblies are also available.

The unusually high selectivity of FD carrier receivers allows channels to be spaced closer together, permitting a greater number of voice and telegraph services. Also, FD carrier spectrum is wide-range—40 to 200 kilocycles. Both features add up to more channels for greater usefulness, today—or for future expansion.

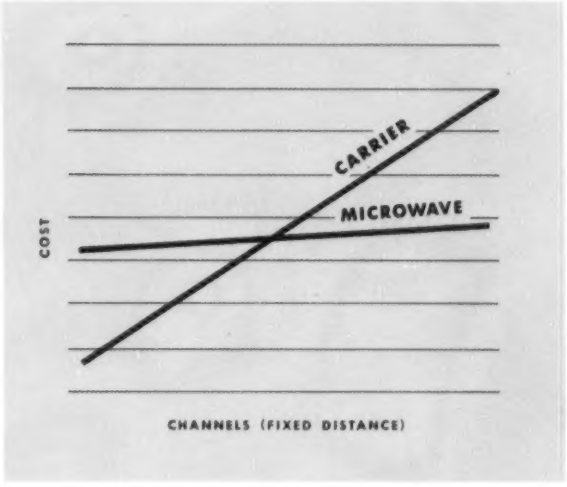
Westinghouse FR-FJ microwave

. . . Most flexible multiplexing system available.

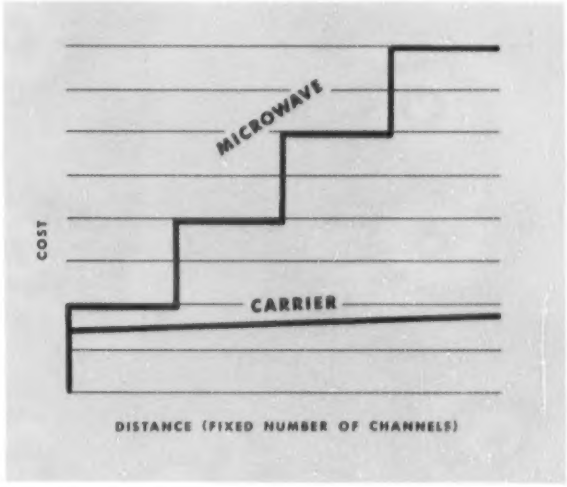
FR-FJ 2000-megacycle microwave is especially designed for the heavy requirements of electric utilities. Up to 30 duplex voice channels are provided. Each of these 30, when used for telegraph alone, can handle as many as 15 telegraphic circuits.

For utmost reliability, each of the 30 voice channels is strictly independent. If one channel develops a fault, all others continue without interruption. That's because the Westinghouse FJ voice band multiplex panel is self-contained—*even including its own power supply*. Only Westinghouse microwave offers such extensive assurance of reliability. Each of the 30 voice channels is crystal controlled. The result—stabilized coordination over wide ranges of input voltages, temperature, and other variables.

Type FR radio and Type FJ multiplex assemblies use only four basic panels each. These panels are complete-



This chart shows the general comparison of carrier and microwave initial costs, relative to the number of channels. Note that carrier's cost is definitely influenced by the number of channels required. Microwave's cost is usually influenced much less.



When referred to distance, a general comparison looks like this: Microwave's cost is strongly influenced by distance, because of the necessity for repeater stations as distance increases. Carrier's cost is not usually affected as much by distance.

Westinghouse

ly adequate for all radio and multiplex functions. System modification, parts stocking and maintenance are thus reduced to simple terms.

A single FJ voice band panel is usable for any of the 30 voice channels. Each voice band panel is adaptable to party-line or private-line service; to two-wire or four-wire termination; to all types of signaling. Party-line service requires no additional equipment, and is free of complicated circuitry. Built-in signaling allows immediate push-to-talk operation of remote VHF base stations.

• • •

Frank Ludemann, Microwave Application Engineer, with a complete station of Type FR microwave radio and Type FJ multiplexing equipment. This modern equipment provides up to 30 voice or 450 telegraphic channels.

Complete Westinghouse systems include

. . . Built-in protection

. . . Provision for additions

FR microwave assemblies include a service channel and alarm panel. The service channel provides a telephone circuit connecting all stations, available for use *at the radio equipment* for service and maintenance communication. The alarm feature, an optional addition, provides automatic reporting of off-normal conditions at all stations.

A new wide-range sleet detector in FD carrier relaying assemblies checks operating conditions of the entire channel.

FD carrier is built on a "building block" basis—coordinated basic units that afford maximum flexibility of installation, and in subsequent alteration to meet system growth.

Installation of FR-FJ microwave is available on a turn-key basis, including surveys, design, construction, buildings, and maintenance. Undivided responsibility is your assurance of highest efficiency and economy in your intelligence communication system.

Fast, reliable conversion of data for transmission is another factor that requires careful selection of the right equipment. For this function, Westinghouse developed Freq-O-Tron* telemetering.

*Trade Mark

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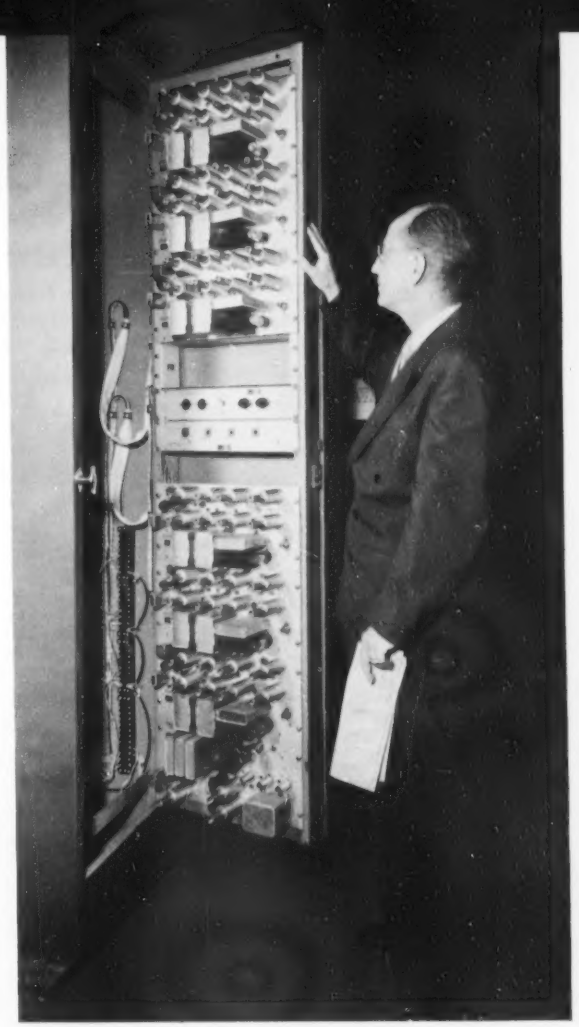
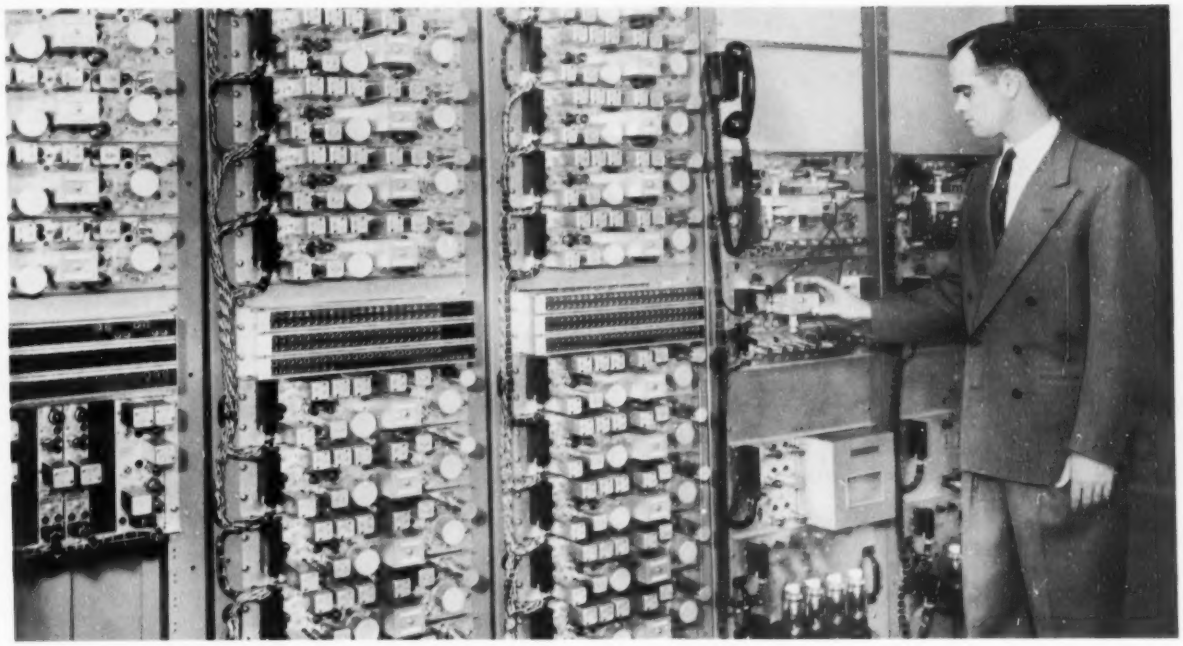


FD power line carrier. Jim Booth, Carrier Application Engineer, demonstrates the highly efficient swinging rack construction that quickly exposes all panel fronts for easy, safe tube checking and routine testing. For complete access to *all* parts, front and back, the rack swings free of the door on its own hinges . . . an important contribution to better, faster maintenance.



FR-FJ 2000 megacycle microwave with multiplexing. The racks on the left contain FJ multiplexing equipment . . . the two on the right, FR microwave radio. Note the neat building block construction, using plug-in unit assemblies and standardized cabinets. This is a significant advantage for installation and maintenance . . . a big advantage, too, for future expansion and rearrangement.

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Freq-O-Tron telemetering transmits facts instantly

Not limited to measuring alone, Westinghouse Freq-O-Tron can transmit any data that can be converted to a proportional d-c millivolt equivalent, including position indication or pressure. It can employ any medium: microwave, power line carrier, or pilot wire.

For the average system intelligence function, such as load dispatching, its exceptional speed is more than adequate.

The Freq-O-Tron system is ideal for totalizing. Since all quantities are reduced to proportional d-c milli-

John Kendall, Relay Sales Engineer, with IT-1 Freq-O-Tron transmitter. Acting as an electronic generator, transmitter converts d-c millivolts input to a proportional output frequency. Signal can be carried by carrier, microwave or pilot wire.

Modulating signal is detected by this IR-2 Freq-O-Tron receiver, shown with Bill Connolly, Relay Sales Engineer. Receiver converts frequency to proportional d-c millivolts and forwards it to recorder or indicator to reproduce original measurement.

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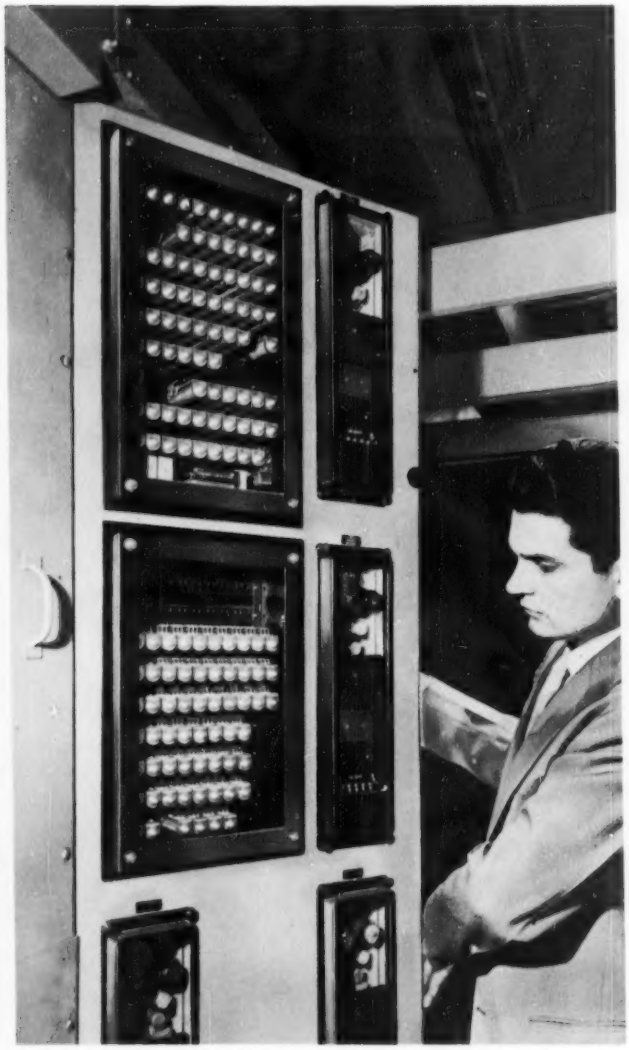
volts, they are added by simple series connections.

Freq-O-Tron telemetering is accomplished in four steps: (1) The primary measurement is made at the point of origin and is converted into proportional d-c millivolts. (2) This quantity is fed to a Westinghouse IT-1 transmitter which converts it to a modulating signal, varying in frequency from 15 to 35 cycles. (3) A Westinghouse IR-2 receiver detects the modulating signal and converts it back to d-c millivolts. (4) A recorder and/or indicator interprets the d-c and reproduces the original measurement.

The transmitter-receiver response is instantaneous (less than 1 second); over-all time for all four steps, including thermal converter and wide-chart, high-speed recorder, is usually well under 3 seconds. Accuracy of the Freq-O-Tron transmitter and receiver is within 2% of full scale.

Freq-O-Tron transmitters and receivers are supplied in Flexitest® cases for projection or semi-flush mounting. The complete chassis may be removed from the case in just a few seconds for inspection or maintenance. Built-in test switches facilitate testing in the case.



Compact design of Freq-O-Tron telemetering equipment permits neat, easy mounting. Exclusive Flexitest case gives quickest access for testing, maintenance, or inspection. Looking over this installation is T. Barabutes, Design Engineer.

Visicode® . . . the most reliable supervisory control

Where the operation of unattended generating plants and substations is a factor in your system, there are many advantages to centralizing control of these stations in one location with supervisory control. Westinghouse Visicode—an "all-relay" type of supervisory control—enables a single operator to exercise continuous control of load dispatching over an entire system, to make rapid decisions in time of system disturbances and to put those decisions into effect almost instantly.

Visicode can be used on any communication system—telephone, carrier or microwave—to control any electrically operated device. It provides lamp indications of the position of devices and telemetered indications of electrical and mechanical quantities.

Automatic check-back makes Visicode the last word in reliability. After a device at a control station has been selected by the operator, the selection is automatically checked and indicated back to the operator *before an operation can be performed on the device.* Visicode cannot perform on incorrect operation, no matter what the cause: control power failure; failure of line wires, carrier channel, or microwave link; or interference of any kind as the result of induction from nearby power lines, lightning, switching surges or other phenomena.

Since Visicode consists entirely of standard telephone-

Westinghouse

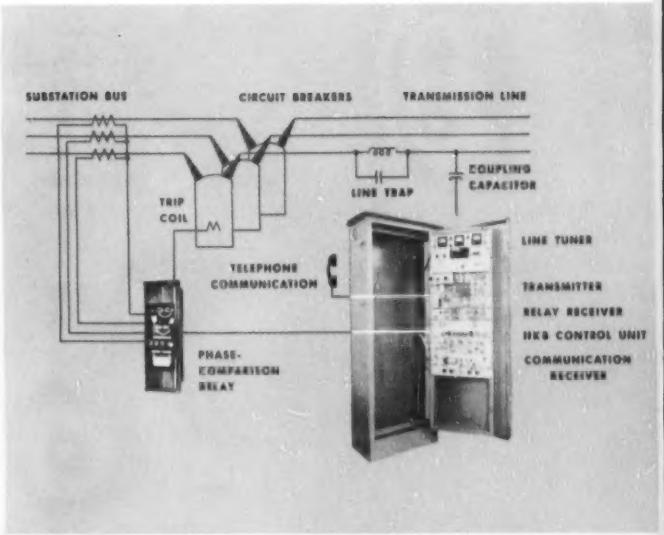
Visicode continued . . .

type relays, very little maintenance is required. Inexpensive narrow-band telegraph channels can be used. Visicode impulses are transmitted at a rate of 15 per second. Simple and inexpensive types of carrier and microwave channels can also be used. And, by completely coordinating Visicode with switchboards and metal-clad switchgear, Westinghouse can save you substantial engineering time and installation expense.

• • •

Westinghouse Visicode supervisory control enables this power company dispatcher to control and supervise the operation of all electrically controlled apparatus in a number of large substations. Centralized remote control means reduced operating costs, more efficient system operation.

YOU CAN BE **SURE**.. IF IT'S



Line drawing above shows simplified carrier relay system. HKB phase-comparison relay compares phase position of currents at terminals of line section to determine whether fault is internal or external to section of line protected.

HKB provides complete phase and ground fault protection. Operates on line current only—no potential transformer required—not affected by out-of-step conditions. Pictured with H. W. Lensner, Senior Relay Design Engineer.

HKB relays . . . high-speed, simultaneous tripping at lowest cost

High-speed clearing of faults on transmission lines by simultaneous tripping of breakers on each end of the fault—made possible by power line carrier and microwave equipment—is highly desirable on key lines. This kind of fault clearing provides stability, continuity of service, quick reclosing, and prevents or minimizes damage to equipment.

Simultaneous tripping in *3 cycles* is possible with Westinghouse HKB relays, whether used with carrier or microwave. These relays are often the most economical for the degree of protection and fast reclosing they make possible.

Stated briefly, HKB relays may be said to keep track of the direction of current flow in a line section. When no fault exists, current flows through the line in one direction only. When an internal fault occurs, current flows from both terminals of the line section toward the fault. This two-directional flow is immediately detected by HKB relays which simultaneously open the breakers on each end of the faulted line section.

In cases where carrier or microwave relaying is being added to a line and existing relays are used for backup protection, the HKB system affords substantial savings over other carrier or microwave relaying systems. It also saves valuable switchboard space, since fewer relays are required in the complete HKB system.

Another relatively new HKB relay feature is the use of vacuum tubes instead of thyratrons in the control unit for continuous grid control—surer action. Vacuum tubes may be tested on a regular maintenance schedule with conventional tube-testing equipment. They may be easily replaced at the first indication of aging—thus eliminating sudden failures.

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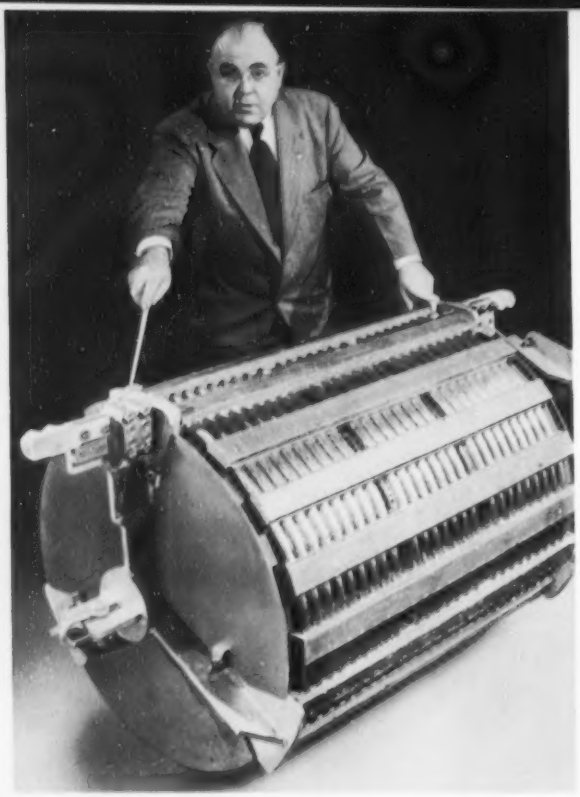


Here, Ralph Marbury, Manager Capacitor Engineering, points out an exclusive Westinghouse line-trap feature—heavy-gauge, nonmagnetic steel end brackets which will withstand forces imposed by fault currents and mounting stresses.

New line-trap design permits high fault current applications

Westinghouse line traps can now withstand higher fault currents than ever before—and provide improved carrier performance, as well. The new coil design and molded bar construction permit extending the short-circuit rating to 36,000 amperes in the 1200-ampere size. This same advance design has been extended to the 400, 800 and 1600-ampere line traps—the most complete line available today.

Westinghouse line traps work four ways to improve carrier performance: (1) Extend its use by reducing the effect of transmission path distortion upon carrier channels. (2) Increase its effective range by reducing the loss of carrier power in connected lines not being used for carrier communication or relaying. (3) Permit normal carrier operation when lines are grounded for 60-cycle power. (4) Assure the reliability of carrier channels even under system disturbances caused by short circuits, grounds, or switching phenomena on connected lines.

The new Westinghouse design is more compact in size — permits smaller phase spacing — saves valuable space in crowded substations. Terminal connections are attached to extra-strong end brackets (see cut). This arrangement prevents short-circuit forces from being transmitted to the coil conductors. Plastic barriers prevent birds or objects from entering and short-circuiting the coils. The traps are easily tuned to any desirable channel without removing the tuning units.

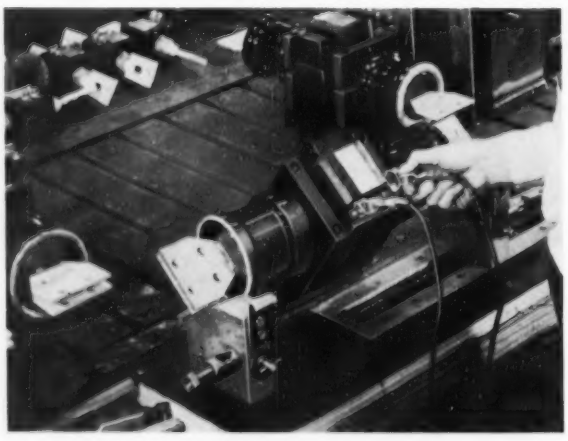
Instrument transformers . . . vital link to system reliability

The reliability of any system of communication must first of all depend upon the continuing ability of its instrument transformers to provide an accurate power source to the control circuits of its metering and relay devices.

To prove beyond any question that this essential reliability actually exists in its instrument transformers, Westinghouse subjects them to 194 rigid tests covering raw materials, subassemblies and completed units.

For instance, every Westinghouse instrument transformer is tested to assure accuracy and long-term dependability for every one of these five vital characteristics:

1. **Turns ratio**
2. **Dielectric strength**
3. **Induced potential strength**
4. **Ratio and phase angle (illustrated)**
5. **Polarity**



A Westinghouse current transformer being tested for ratio and phase angle.

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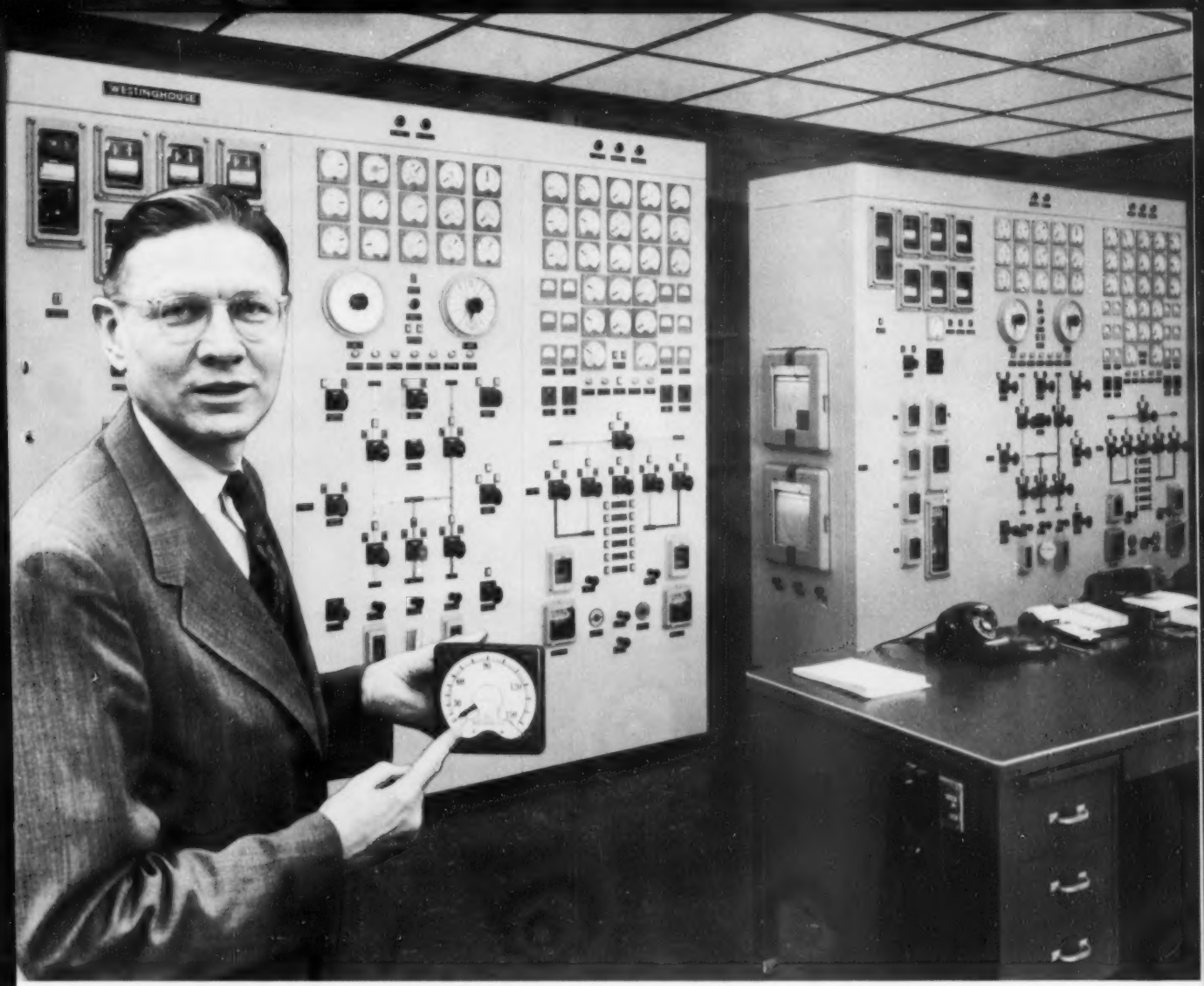

Demonstrating the superior readability of these K-24 instruments is Larry Lunas, Supervising Engineer, Instrument Section.

K-24 instruments . . . readable from 20 feet . . . from angles of 65 degrees

Electrical data gathered by telemetering is highly important—and errors can be costly. Westinghouse K-24 full-view, circular scale instruments are designed to help eliminate these errors because they are so easy to see — from distances greater than 20 feet — or from angles up to 65 degrees.

They are shadow-proof and glare-proof, too. The unique dial design takes advantage of proved optical principles to assure complete visibility under all lighting conditions.

Legibility like this means that K-24 instruments do not have to be spread out at a low level on the board. They can be grouped compactly in higher banks, thus saving space. One man operation is simplified.

K-24 instruments have nonaging springs—preaged permanent magnets and a permanently white, indestructible dial. Special processing and rigid quality control procedures assure low-friction pivots.

When used for telemetering applications with Westinghouse Freq-O-Tron equipment, K-24 instruments greatly reduce chance of human error in reading the electrical data so important to system efficiency.

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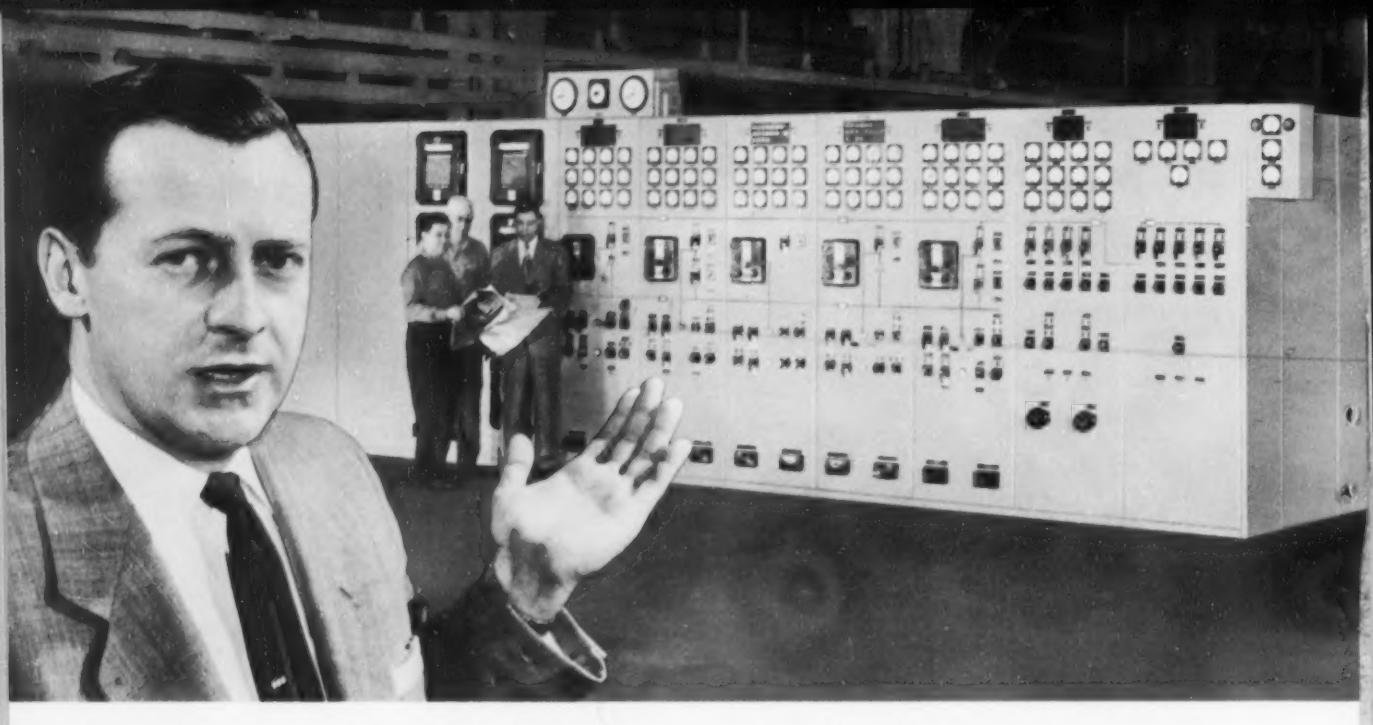

Westinghouse control switchboards are modern in appearance, functionally laid out. They are highly accessible for inspection and maintenance—offer maximum safety to operating personnel—can be easily extended at either end.

Control switchboards provide centralized operation

There are many advantages to centralizing your communication and control equipment in functional Westinghouse control switchboards. In one location, you can combine all the control, indicating, recording, regulating, and protective equipment needed to operate a generating plant, substation, or remote stations. Control switchboards are simple to operate and maintain—can be easily expanded to grow with the system. And, through Westinghouse coordination and supply of all equipment for the complete job, you gain one-manufacturer responsibility—save substantially on engineering work and installation expense.

Westinghouse control switchboards are compact, factory-assembled units that can include protective relays, carrier or microwave interconnections, supervisory control and telemetering instruments — plus all the necessary auxiliary devices. Westinghouse engineers can tailor your installation from eight basic switchboard designs — standardized by NEMA: vertical, enclosed, dual, and duplex switchboards; control desks; benchboards; dual and duplex benchboards.

Westinghouse switchboards maximize the effectiveness of your communication and control equipment. Through them, you can create a highly efficient operations center that can give you finger-tip control, concentrated in the hands of your most skilled operators.

CP-1015

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If you'd like further information, you'll find your Westinghouse representative ready and anxious to serve. Or, if you prefer, the booklets listed below can be obtained by writing direct to Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania.

☐ Power Line Carrier	B-5873
☐ Microwave	B-5850
☐ Freq-O-Tron Transmitter	IL 41-810.1
☐ Freq-O-Tron Receiver	IL 41-810.3
☐ Visicode Supervisory Controls	DB 32-450
☐ HKB Relay	IL 41-650
☐ HKB Carrier Relay System	IL 41-600.3
☐ Line Traps	DB 49-620
☐ K-24 Instruments	CS 43-200
☐ Instrument Transformers	PL 45-000
☐ Control Switchboards	DB 32-500

Name_____

Title_____

Company_____

Street_____

City_____ State_____

CP-1015

Oscillograph

(*Continued from page* 160)

using mono-acceleration principle, it is said to minimize spot and field distortion. Power supplies and critical tube heaters are electronically regulated.

Allen B. Du Mont Laboratories, Inc, 760 Bloomfield Ave, Clifton, N. J.

Boom

Light-weight boom, No. 175, is designed for lifting light material to cross arms. Base of boom is adjustable to various cross-arm widths. Base is high-tensile aluminum alloy; 35-in. wood boom is Maine white oak. A snatch block may be attached to eye bolt near top of boom. Boom is set at an angle to allow clearance when pulling. Weight is 9 lb.

J. F. Hodgkins Co, 140 Water St, Randolph-Gardiner, Maine.

Goosenecking Boom

Model 80 4-ton truck crane has hydraulically-operated goosenecking as optional boom feature. By pushing a

"But how do you get over a Cyclone Fence?"

● Even when a burglar has a Ph.D., he thinks twice before he tangles with a Cyclone Chain Link Fence.

For many years, Cyclone has been dashing the hopes of expert criminals; until today it is the most widely used property protection fence in the world. Although it is primarily designed for protection, Cyclone gives you the additional benefits of long service life and neat appearance.

The thick zinc coating is applied to the steel wire *after* the fabric is woven—thereby eliminating cracked or checked galvanizing at the bends and open cut ends. Permanent, factory-trained erection crews insure that your Cyclone Fence will be solidly set in concrete footings and stretched tight and trim. It adds up to good looks, protection, and low maintenance.

Send for our free booklet that tells all about the many different kinds of world-famous Cyclone Fence.

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WAUKEGAN, ILLINOIS • SALES OFFICES COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S CYCLONE FENCE

Cyclone is the trade-mark name of fence made only by Cyclone. Accept no substitute.

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Our informative booklet is filled with photographs, drawings and graphic descriptions of different styles of fence and gates for the protection of property. Whether you're interested in a few feet of fence or miles of it, you'll find this booklet worth your while. Send for your copy. It's free.

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Cyclone Fence, Waukegan, Ill., Dept. V-44

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USS

UNITED STATES STEEL

THE SUBOX SYSTEM IS PREFERRED FOR USE ON STEEL TRANSMISSION TOWERS

This wide-spread acceptance and confidence has developed because Subox & Subalox paints

1. Adhere well and are thoroughly rust-inhibitive, containing a chemically active pigment of lead-suboxide.
2. Reenforce the galvanizing and do not fail after a few years by peeling or flaking.
3. Resist normal acid and alkali exposure and stand up well under abrasive conditions.
4. Closely match the galvanizing and maintain a neat uniform appearance — further good public relations.
5. Life of a Subox paint job averages 5 to 8 years. Makes single coat maintenance highly desirable from a cost standpoint.
6. Efficiently protects all other types of electrical equipment and structures, simplifies stock-keeping.

A new Handbook of practical recommendations for simplified maintenance is just off the press. Entitled, "CORROSION CONTROL OF ELECTRIC LIGHT & POWER STRUCTURES AND EQUIPMENT". It is yours for the asking.

Subox Inc.

3 Fairmount Plant, Hackensack, N. J.

lever, an operator can fold boom down over a loaded trailer, and truck is ready for road travel. Goosenecking solves overhead-clearance problem.

Gooseneck boom, when unfolded for work, has same strength and capacity as standard boom. Goosenecking is accomplished by hydraulic cylinder installed in boom.

Pitman Manufacturing Co, 300 W. 79th Terrace, Kansas City 14, Mo.

Coming New Equipment

Received Too Late for This Issue

Straight-Line Clamp

Brewer-Titchener Corp—Is available in forged-aluminum or steel material

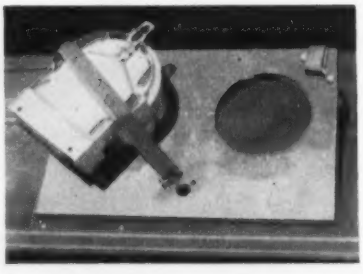
UHF Mobile Radio

Allen B. Du Mont Laboratories, Inc—is rated 12 w at 460 Mc

UF Cable

Underground feeder cable is suitable for home, farm, and light industrial areas in accordance with Article 339, National Electrical Code. Flamenol Type UF cable is made with one, two, or three conductors. Single-conductor UF is in sizes 14 to 4 AWG. Two- and 3-conductor cables are in sizes 14, 12, and 10 AWG, listed as Type UF and NMC.

General Electric Co, 1285 Boston Ave, Bridgeport 2, Conn.



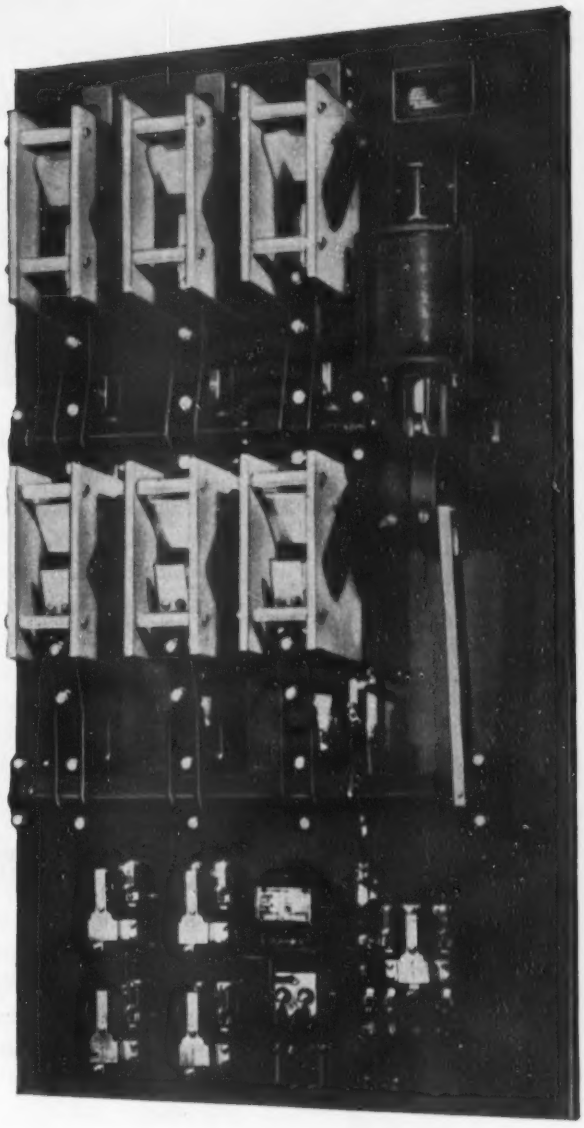
Meter Shelf

Meter shelf is designed for Carry-All truck bodies. Meters fit into padded recesses in shelf and are held in place by adjustable, flexible straps. A body completely equipped with

K&M

Asbestos Products

for electrical applications



Automatic Transfer Switch, manufactured by Automatic Switch Co., Orange, N. J.

This switch makes use of two reliable K&M electrical materials: K&M Ebonized Asbestos for the panelboard, and K&M Monobestos for the arc shields.

Ebonized Asbestos is an ideal electrical insulating material composed of asbestos fiber and portland cement. It is molded under pressure into sheet form and impregnated with an asphaltic compound to give it very high dielectric strength. It is strong, light in weight, of uniform density, and withstands vibration and shock.

Monobestos, made of asbestos fiber and portland cement, is a durable, readily workable sheet material having high resistance to arc and fire.

In addition to these materials, K&M makes cold molded asbestos parts to specification and Asbestos Cloth, Tapes and Tubing for electrical equipment. Write for details on any of these products.

KEASBEY & MATTISON COMPANY • AMBLER • PENNSYLVANIA

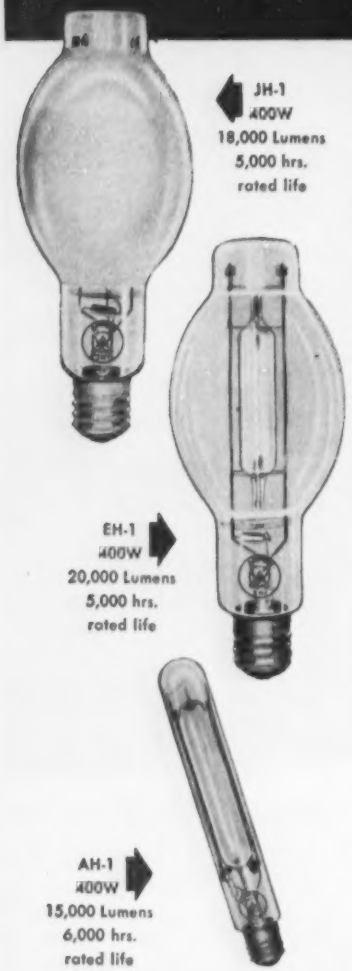
Nature made asbestos . . . Keasbey & Mattison has made it serve mankind since 1873

In Canada: Atlas Asbestos Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver

K&M best in asbestos ®

STREET LIGHTING GOES MODERN!

WITH AMPLEX MERCURY VAPOR LAMPS



TWICE AS MUCH LIGHT for the same wattage consumed... double the illumination with no boost in the lighting bill. Burning life several times longer than incandescents. That's what municipalities and utilities get with the new Amplex Mercury Vapor Lamps for street lighting... and it adds up to completely new lighting efficiency and extraordinary economies.

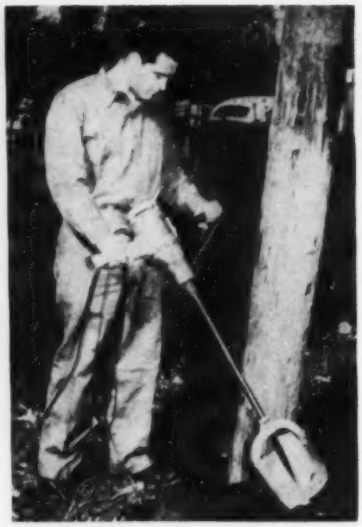
Amplex Mercury Vapor Lamps are made in three types, the ever-popular EH-1 and AH-1, and the highly important new JH-1 which is color-corrected by means of a special phosphor coating that produces a warm, neutral light and abolishes all need for color-correcting incandescents. Performance facts of all three lamps are shown under their respective illustrations.

For the full story on Amplex Mercury Vapor Lamps and for detailed information regarding their practical application, write **Amplex Corporation, Department J-4, 111 Water Street, Brooklyn 1, New York.**

AMPLEX

Incandescent, Fluorescent, Sealed-Beam Reflector, Infra-Red, Rough Service, Mercury Vapor, Photoflash, Street Lighting and Traffic Signal Lamps, Swivelites, Hi-Hats and Display Lighting Accessories.

the shelves can carry 24 meters.
Morrison Steel Products, Inc, 601 Amherst St, Buffalo 7, N. Y.



Digger

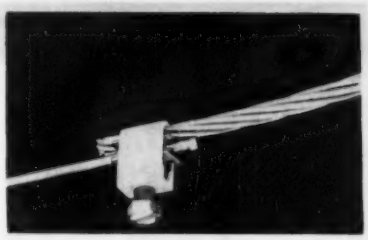
One-man operated earth-boring machine, Super Hole-A-Matic, digs holes to 12 in. diameter, 15 feet deep. Portable machine will operate from 1.5-kw. ac or dc generator. It is said to work with a pulverizing, grinding action, chewing up soft shale, and riding above large rocks without damage.
Multi-Matic Corporation, 14741 Bessemer St, Van Nuys, Calif.

Transmission

Heavy-duty, 2-speed transmission, T-31, is designed for earth-boring equipment, and is usable for winches, pumps, sprayers, etc. Transmission is used with side-mounted power take-off on a truck transmission. Ratings are: 0.67 or 1.67 gear ratio, 5.1 hp at 100 rpm. Features include: push-pull shift control; heavy duty bearings; 1¼-in. hardened shafts; hardened 1-in. face, 6/8 pitch gears.
Tel-E-Lect Products, Inc, 10,001 Minnetonka Blvd, Minneapolis 16, Minn.

Service Connector

Service entrance connector is for aluminum-to-aluminum or aluminum-to-copper conductors. Body is ex-



truded aluminum, cadmium plated. Screw has slotted hex head. A spacer is used under screw, and another between conductors. Spacer surfaces are grooved to line up conductors. For aluminum-to-aluminum, spacers are cadmium plated; for aluminum-to-copper, two bimeal spacers are used. **Reliable Electric Co, 3145 Carroll Ave, Chicago 12, Ill.**

Pickup Truck

Half-ton pickup truck, the "One Hundred," has 104-hp engine with 7.0 compression ratio and operates on standard fuel. Truck has 115-in. wheel base with 6½ ft pickup body. Model R-100 has gross vehicle weight rating of 4,200 lb; R-102 is rated 4,600 lb. Road clearance is 7½ in.

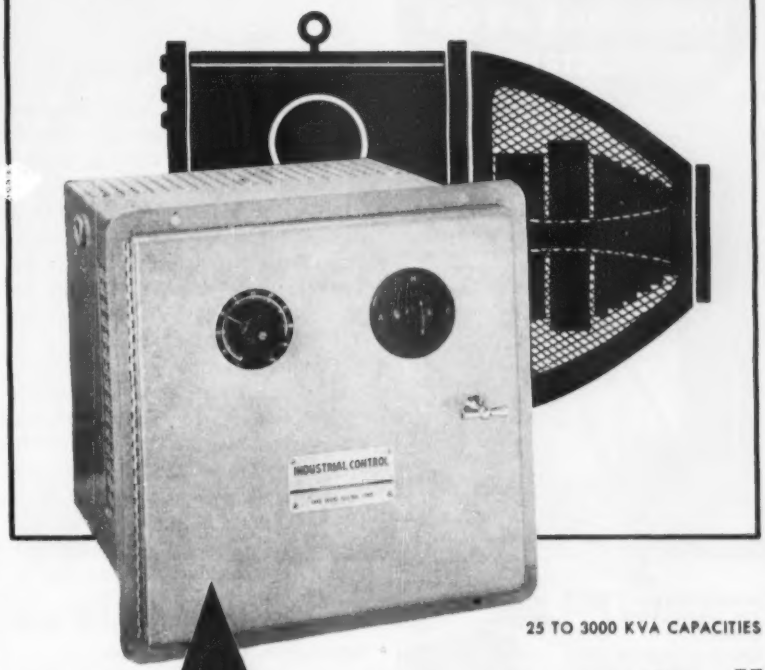
Other features claimed are: syncro-mesh transmission, 21-ft turning radius, curved windshield, soft springs, steering-column shift lever, high-ratio steering, and semi-floating rear axle. Standard tires are 6.70 x 15, 4-ply.

International Harvester Co, 180 N. Michigan Ave, Chicago 1, Ill.

4-Wheel Drive

Four-wheel drive for Chevrolet trucks has 2-speed ranges. Trucks may be factory equipped with Napco Powr-Pak drive, or trucks in use may be converted. Standard Chevrolet parts are used. This is an improved

Completely New Automatic Generator Voltage Regulator



25 TO 3000 KVA CAPACITIES

THE "Autostatic" BY LAKE SHORE

Here . . . for the first time . . . is a voltage regulator with no moving parts or electronic tubes to wear or fail. The new AUTOSTATIC regulator eliminates maintenance expense, yet costs no more than comparable mechanical units.

In addition, the AUTOSTATIC operates with a speed and accuracy impossible to units having moving parts. It reacts almost instantaneously to correct voltage fluctuations caused by changes in the generator load. There is no time lag because of inertia and friction. Output fluctuations are reduced to a negligible quantity, both in magnitude and duration.

The AUTOSTATIC is available in three sizes with capacities of 25 to 100 KVA, 100 to 400 KVA, and 400 to 3000 KVA.

Write today for Bulletin 1517.

1869-LS

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ENGINEERS • DESIGNERS • FABRICATORS

LAKE SHORE ELECTRIC CORPORATION
225 WILLIS STREET • BEDFORD, OHIO

CUT COSTS WITH GREENLEE TIMESAVING TOOLS FOR ELECTRICIANS

HYDRAULIC BENDERS FOR CONDUIT, PIPE

Quickly produce your own bends *right on the job*. With a GREENLEE Bender *one man* in but a few minutes makes smooth, accurate bends in pipe and conduit up to 5". Compact, portable . . . saves hours, saves materials.

HAND BENDERS FOR TUBING, PIPE, CONDUIT

Quickly form small-radius bends without flattening or kinking. Especially designed to make neat bends for sharp corners, nooks and other close quarters. Saves up to 75% in time and materials on many jobs.

KNOCKOUT PUNCHES AND CUTTERS

For fast, easy enlarging of knockouts and cutting of holes in metal boxes, cabinets, panels. Various sizes and models for making openings for conduit sizes from ½" up to 3½". To operate, simply turn with a wrench.

HYDRAULIC KNOCKOUT PUNCH DRIVER

Portable hydraulic unit for driving GREENLEE Knockout Punches. Speeds jobs . . . easily operated. Develops over 11 tons of pressure so that conduit openings are cut in 10-gauge metal with ease.

CABLE PULLER AND BORING TOOLS

Specifically designed to save time, speed jobs . . . eliminate tedious, heavy work. Companion tools to many other GREENLEE timesavers for the electrician.

GREENLEE

Write for new Electrical Tool Folder, Greenlee Tool Co., 1804 Columbia Ave., Rockford, Ill.

model of 4-wheel drive used during World War II on military vehicles.
Northwestern Auto Parts Co, 834 N. 7th St, Minneapolis, Minn.

Fluorescent Fixtures

A line of "EFU" explosion-proof fluorescent fixtures are for use in hazardous locations, Class I, Groups C and D; Class II, Groups E, F, and G. Fixtures include 2, 3, and 4-lamp designs for straight and angle mounting. Fixtures offer choice of 3 different ballasts and are designed for 40 w, 48 in., T-12 and 100 W, 60 in., T-17 fluorescent lamps.

Fixtures may be installed end to end, and when used with appropriate fittings conform to National Electric Code standards. Re-lamping may be from either end. Units are factory sealed. Line connections are to a terminal block in junction chamber. End housings are cast aluminum; reflectors are steel, white enameled inside, grey exterior.
Appleton Electric Co, 1701-59 Wellington Ave, Chicago 13, Ill.

Reversing Switch

Cam-type switch is designed to reverse 3,000 amp dc up to 15 v, as for a plating tank. It can be furnished as series-parallel switch, as for double-commutator generators.

Panels are ebony asbestos. Handle in neutral position disconnects line. Wiping action of laminated-copper moving contacts cleans surfaces. Switch is rear connected and is furnished with jumpers and terminals.
Columbia Electric Mfg Co, 4519 Hamilton Ave, Cleveland 14, Ohio

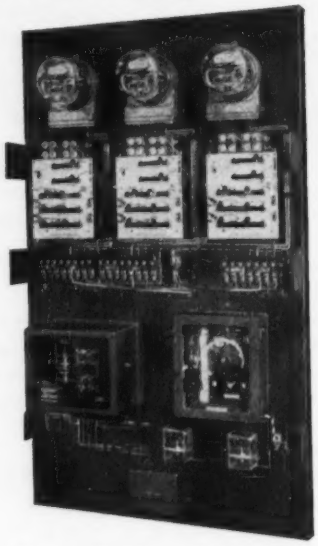
Shovel Trip

Electrically-operated shovel dipper trip is usable on ⅜-cu-yd power shovels. It consists of a thumb-operated pushbutton switch mounted on swing clutch lever that activates an electric motor which winds up a dipper chain and trips the bucket dipper. The trip attachment is optional on new shovels, or may be installed on previous models.
Schield Bantam Co, Waverly, Iowa

Transformer Loss Compensator

Saves you Money!

SPECIAL FEATURE: It saves you money because it provides an accurate means of measuring the energy and demands of high-voltage services at the low-voltage side of the transformer.



THE TESCO compensator adds to the registration of the watthour meter an amount equal to the sum of the iron and copper losses of the transformer bank. It may be used with practically any type of watthour meter and . . . importantly . . . no changes are made in the meter itself, either structurally or in adjustments . . . It is produced with two and three element types for use with two-element or three-element meters on any type circuit.

Some of the Users . . .

Phila. Electric Co. Penna. Power & Light Co. Texas Power & Light Co. U. S. Bureau of Recl. Public Service Co. of New Hampshire. Utah Power & Light Co. Northern States Power Co.

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Detailed information on operation, installation, applications. Write for Bulletin NO. 63-A.

EASTERN SPECIALTY CO.
PHILADELPHIA 40, PA.

MORE NEW PRODUCTS
about which you should know

Magnetic Research Corp, 318 Kansas St, El Segundo, Calif. has **regulated dc power supplies** for 6, 12, or 28 v and up to 100 amp. Magnetic amplifier, using no tubes, regulates varying load to ±1% with 95 to 135 v ac service . . . Lindberg Engineering Co, 2450, W. Hubbard St, Chicago 12, Ill. announces Model LI-5A-1 high frequency **induction heating unit** operating about 450 kc. Output is 5 kw (284 Btu per min.); input is 12.5 kva, 230 or 460 v.

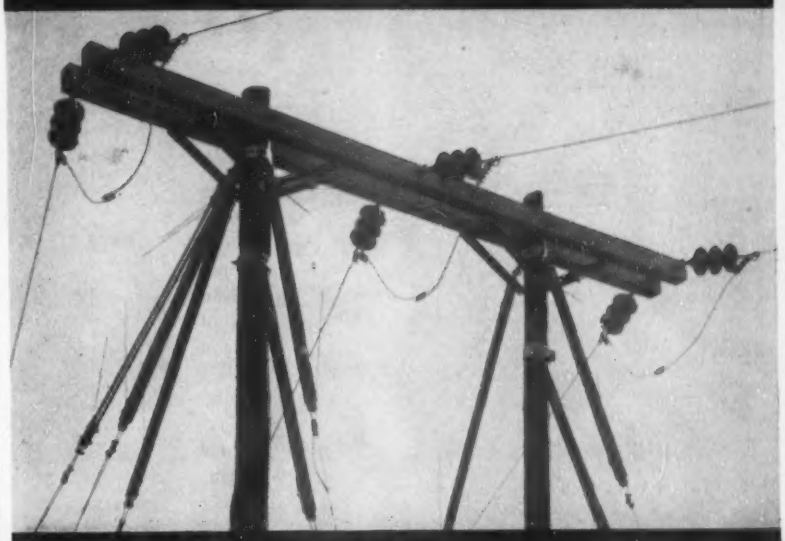
Ampo Metal, Inc, 1754 S. 38th St, Milwaukee 46, Wis. announces nonmagnetic, spark-resistant one-ton **chain hoist.** Constructed mostly of copper-base alloys, unit is recommended for hazardous areas . . . Clements Manufacturing Co, 138 Cole St, Dallas 7, Texas announces **storage magazine** which will hold two 50-lb boxes of dynamite. Built to Bureau of Mines specifications, magazine is ventilated, plywood-lined, has grounding terminal and weighs 155 lb, measures 23 x 29 x 12 in.

Northeast Scientific Co, 1 Gray St, Cambridge 38, Mass., announces Model RE-2002 **regulated power supply.** Output is 0-25 ma, ajustable 700 to 2020 v dc, 0.5 ohm internal impedance. Input is 105-125 v, 50-60 cps . . . Beckman Instruments, Inc, 220 Wright Ave, Richmond, Calif., makes direct-reading universal **counter and timer,** Model 5510. Unit counts to 10^6 cps, measures time intervals $3x10^{-5}$ to 10^6 sec, and measures frequency 0 to 10^6 cps. Standard rack panel 8¾ x 19 in.

Ward Leonard Electric Co, 115 MacQuesten Parkway S., Mount Vernon, N. Y., has 300-w, ring **rheostat,** 1 to 2,500 ohms, 6 in. diam . . . Phaostron Co, 151 Pasadena Ave, South Pasadena, Calif., has 1½ to 4½ in. **panel meters** in various cases and styles.

Minneapolis-Honeywell Regulator Co, Freeport, Ill. has subminiature rotary **selector switches** with 2 to 8 units, and a small **two-circuit switch,** TB series . . . Fenwal Inc, Pleasant St, Ashland, Mass., has **midget thermostats,** ¼-in. diam x 2⅜-in. long.

PUT UP



AND STAY UP

with LAUGHLIN drop forged steel hot galvanized FITTINGS

Transmission or distribution - guys stay put when they're fastened with Laughlin fittings. Their extra strength, extra quality makes them outlast ordinary fittings on every job. Try them yourself — and see!

SAFETY "FISTGRIP" WIRE ROPE CLIPS

Drop forged steel, hot galvanized, with standard heavy hex nuts. Foolproof, identical saddles can't be put on wrong. Fewer clips needed, holding power is greater than with conventional clips. Sizes for strand diameter from 3/16" to ⅝" Smooth Bore, 3/16" to 1½" with Rifled Bore.

SHACKLES
Round Pin Chain
Round Pin Anchor

Weldless, drop forged steel, available with screw pins, round pins with cotter, hex head bolts and nuts with cotter. Sizes from ¼" to 3"

THIMBLES

Wrought steel, galvanized, in both regular weight and heavy plow steel. Open Guy Thimbles stocked in ⅜", ½" and ⅝" sizes.

TURNBUCKLES

Sturdy drop forged steel, weldless, hot galvanized. Available in: (1) hook and eye, (2) eye and eye, (3) jaw and eye, (4) hook and hook, (5) jaw and jaw. Heavy reins with hex ends, precision threading. Exclusive eye design takes shackle one size smaller than turnbuckle diameter. Sizes (diameter & takeup) ¼"x4" to 2¾"x24".

These are only part of Laughlin's complete line of over 1500 types and sizes of wire rope and chain fittings. The line also includes safety hooks, wire rope sockets, swivels, double clevis links and weldless rings.
For complete data, ask for Catalog 155. Laughlin fittings are available through leading distributors everywhere.

Photo courtesy Charles E. Eaton

LAUGHLIN
THE THOMAS LAUGHLIN COMPANY
426 Fore Street, Portland, Maine

NEWS ABOUT PEOPLE

GILBERT J. WILLIAMS

ALFRED M. WADE

Williams, Wade Elevated . . .

. . . by Connecticut L&P to executive vice presidency and vice president of sales, respectively. Knowlton retires as chairman

Connecticut Light & Power Co has announced several top level promotions.

Gilbert J. Williams, Central and Western Divisions manager, was elected executive vice president and Alfred M. Wade, Eastern Division manager, was elected vice president in charge of sales to succeed the late Robert G. Ely (EW, March 8, p 176).

The utility also announced the retirement of Robert H. Knowlton as chairman of the board. He will continue to serve as a director and as a member of the board's executive committee.

In changes that become effective April 1, Gas Superintendent David W. Price, now located in the utility's general offices in Berlin, was named manager of the Western Division with headquarters at Waterbury. He replaces Williams.

Eastern Division Manager . . . Edward R. Peterson, Central Division engineer with headquarters in New Britain, was appointed manager of the Eastern Division with main offices in Willimantic. He succeeds newly elevated Vice President Wade. John W. Burg, assistant gas superintendent now assigned to Connecticut L&P's Berlin headquarters, was named to Peterson's engineering post.

Essex District Manager B. H. McElhone, whose retirement became effective March 31, will be succeeded by Francis J. Mellon, manager of the East Hampton district. W. Lindsay Booth, industrial sales engineer in the Danielson district, takes over Mellon's duties as East Hampton district manager.

With Connecticut L&P since 1920, Williams filled various engineering posts prior to becoming New Milford district in 1929. In 1937 he was made division engineer for the Eastern Division, becoming divisional manager in 1946. Since 1952 he has served as Central Division manager and as Western Division manager with offices at Waterbury.

Filled Advertising Posts . . . Wade joined the company's advertising department in 1924. In 1928 he accepted a position with General Motors Corp. Wade remained there until 1932 when he rejoined Connecticut L&P's advertising department. He was made manager of the Rockville district in 1941 and Greenwich district manager three years later. In February, 1952, he was appointed Eastern Division manager with headquarters in Willimantic.

Knowlton, an engineering graduate of Cornell University, has served with the company since 1910. He was elected vice president in charge of sales and public relations in 1927, executive vice president in 1939, president in 1948, and board chairman in 1952. He has been a member of the board of directors since 1935.

•

Milton S. Olberg, with the Anoka County Electric Cooperative Light & Power Association, Anoka, Minn., since 1949, has been named manager of the co-op to replace **George L. Morris,** who has resigned.

Ralph D. Stauffer, vice president and chief engineer of New England Gas & Electric Association, Cambridge, Mass., has been given the responsibility of directing electric operations throughout the system. **Horton L. Chandler,** assistant to the president of the NEGEA Service Corp, an Association affiliate, is now charged with responsibility for the advertising, public relations, employee relations, and electric new business departments. All other Service Corp departments now report to **Burdette A. Johnson,** comptroller.

W. B. Shenk has been promoted to director of commercial and industrial development for Florida Power Corp. A veteran of 29 years in the electric industry, Shenk has served as director of the commercial development department since 1945.

E. D. Edwards, vice president of Central Illinois Light Co and **H. S. Eberhard,** executive vice president of Caterpillar Tractor Co, Peoria, Ill., have been elected directors of Central Illinois Light. They succeed **R. C. Lamphier, Jr.,** vice president of Sangamo Electric Co, Springfield, Ill., and **J. A. Longley,** who retired as president of Central Illinois Light in 1952.

O. L. K. McKibben, special assistant to the comptrolier of West Penn Power Co, has been named assistant comptroller of the utility. He joined West Penn Power in 1930.

Lowell Endahl has been employed as agricultural engineer by the National Rural Electric Cooperative Association with headquarters in Washington,

Bars – Shapes – Plates

immediate delivery from world's largest stocks

You get *all* your requirements in *any* quantity when you call Ryerson for bars, shapes and plates. You also get steel of sound, known quality and steel service know-how that makes your job easier.

Need *bars?* Our stocks are the most diversified as well as the largest and every bar is ordered to a definite spec.—even bars often referred to as "mild steel" are quality controlled to AISI spec. C 1015 for best forming and welding qualities consistent with usual tensile requirements.

Need *structurals?* Here you find the most complete selection, including extra-long lengths. And, you can depend on square, practically burr-less friction saw cutting because of our special method of blade alignment and frequent blade changes.

Need *plates?* You get them here up to 10 inches thick. And shops which have had difficulty forming A-7 quality plates will be glad to know that Ryerson now carries plates of forming and welding quality.

The completeness of these stocks enables you to combine all your carbon steel requirements on one order for lower prices under the Ryerson quantity differential plan and for lower freight rates. So, whether you need a single beam or a carload, call Ryerson for immediate delivery from the world's largest stocks.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

RYERSON CERTIFIED STEELS

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

THE FACTS OF
LIGHT
...AND THOMPSON
Servisafe
METAL POLE UNITS
FACT NO. 1: Modern parkway and street lighting should be designed for appearance as well as efficiency. In keeping with this trend, THOMPSON now offers an exclusive new Metal Pole Unit that features streamlined beauty and assures peak lighting efficiency at all times.
FACT NO. 2: Only THOMPSON "Servisafe" Units incorporate a patented disconnecting and lowering mechanism that permits rapid . . . safe . . . efficient ground-level luminaire servicing by one man.
FACT NO. 3: THOMPSON "Servisafe" Units eliminate all maintenance hazards. No ladders, scaffolding or lifts are needed for luminaire servicing . . . luminaires can be quickly lowered, relamped and cleaned, and then repositioned from the ground. Electrical dangers are eliminated because lowered fixtures are 'dead'.
FACT NO. 4: THOMPSON "Servisafe" Units facilitate low-cost maintenance by saving man hours . . . reducing accidents. Pole-mounted luminaires now can be serviced at a fraction of normal time and cost.
Write for catalog PB-53 for complete details
1755-TE
1. DISCONNECT
2. LOWER
3. SERVICE
4. REPOSITION
5. REPEAT
THE THOMPSON ELECTRIC CO.
1114 POWER AVENUE • CLEVELAND 14, OHIO

D. C. His appointment to the post marks the first time NRECA has offered this type of service to its members. Endahl has served for the past three years as head of the power use department of Sioux Valley Empire Electric Cooperative located at Colman, S. D.

George S. Bond has been named advertising manager of P. R. Mallory & Co, Inc, Indianapolis. Associated with Mallory since 1937, he has been serving for the past year as sales manager of the firm's Metals and Ceramics Division.

Harold Harmony, formerly assistant superintendent for the Southern Division of Puget Sound Power & Light Co at Olympia, Wash., has been transferred to a similar post in the Northern Division at Burlington. Harmony replaces **Ray Roberson,** who has been transferred by the utility to other duties in Bellingham.

Fred E. Harrell, vice president of Reliance Electric & Engineering Co, Cleveland, has been given the additional duties of director of special projects, a newly created post concerned with new building projects and company growth problems. **Hugh D. Luke,** formerly manager of central production planning, becomes manager of manufacturing rotating equipment, and **Stephen W. Feiss,** formerly a manufacturing staff project engineer, assumes the position of general superintendent of Reliance's Ivanhoe Division.

Stephen V. Dillon, manager for electrical products of Johns-Manville Corp has been appointed to the newly established post of manager for electrical equipment industry in the firm's special industries department. Dillon's successor is **Wilbert G. Hoffer,** staff manager in the electrical department of the Industrial Products Division in New York since 1948.

Get Egleston Medal

Walter H. Sammis, president of Ohio Edison Co and Edison Electric Institute, and **Frank A. Ayer,** international copper mining consultant, have been named 1954 recipients of the Egleston Medal, Columbia University's highest award "for distin-

guished engineering achievement." Ayer recently was associated with Copper Range Co and Phelps Dodge Corp.

•

William W. Heimbach has been named manager of industrial relations for Westinghouse Electric Corp's Steam Division. Prior to joining Westinghouse's headquarters staff in Pittsburgh last year, Heimbach was associated with General Cable Corp as assistant director of personnel relations.

Howard E. Murphy, electrical engineer of Stone & Webster Engineering Corp, retired on April 1 from the Boston organization, which he joined in 1907. He expects to open engineering consultant offices in Cohasset, Mass.

R. C. Rogers has been made manager at Lancaster and Stanford, Ky., for Kentucky Utilities Co. With the utility since 1935, Rogers has served for the past three years as commercial service engineer in the Glasgow, Elizabethtown and Lebanon districts.

Loren W. East has resigned as public utility engineer for Oakland, Calif. Prior to assuming the city post in 1949, East had his own consulting engineering firm in Los Angeles, dealing primarily in public utility regulations and industrial management.

Wayne G. Siegelin has resigned from the Bureau of Reclamation in Denver to go to the International Boundary and Water Commission to take charge of the U. S. operation of the Falcon Dam on the Mexican Border. For six years Siegelin was chief of power operation and maintenance for the Bureau's Region 7.

Kenneth Craver, plant engineer of Martins Ferry (Ohio) Municipal Light & Power Department, has been appointed plant production superintendent. In another appointment, **Earl Meeker** was made superintendent of distribution.

Raymond A. Sirman has been promoted from manager of the Wasco (Calif.) office of Pacific Gas & Electric to the newly created post of commercial and sales supervisor for the company's Fresno district. Sirman, with the utility since 1927, will be succeeded by **Matthew B. Hothersall,**

WINSLOW MEGOHM DECADE RESISTANCE BOXES

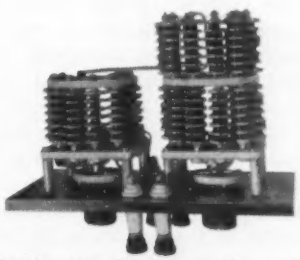
Accuracy within ±0.1% in high megohm ranges!

Model 341, 4 dials, measures to 111.1 megohms in steps of 10,000 ohms. Fully shielded heavy aluminum case. Ground post for convenient AC measurements.

Resistance elements in these Megohm Decade Boxes are wound non-inductively on ceramic forms with a specially developed alloy wire having a negligible temperature coefficient over a range from —50° C to +80° C. Each spool's resistance, as well as that of the entire decade, is held within a deviation of 1/10 of 1% throughout this temperature range, and provides even greater stability at room temperatures. Accuracy is maintained over a frequency range from DC to 20 KC.

Each spool safely dissipates 2 watts. The switch arm consists of multiple leaves of phosphor bronze that are self cleaning by wiping action, and the entire switch is heavily silver plated. This construction thereby assures continued accuracy of measurements over long periods of constant use.

Winslow Megohm Decade Boxes are available in 1, 2 and 4 dial models covering resistance ranges to 111.1 megohms. *Write for catalog.*



Interior view showing use of ceramic insulation throughout. This construction insures minimum current leakage and highest accuracy.

Model 340, 2 dials, measures to 110 megohms in steps of 1 megohm. Heavy aluminum case and panel provide complete shielding for AC measurements. Ground post in panel. Can also be used as a potential divider.

THE WINSLOW COMPANY
NINE LIBERTY STREET • NEWARK 5, NEW JERSEY

DIAMOND
"UTILISCOPE"
(WIRED TELEVISION)
IMPROVES
Centralized Control

Operator in central control room of large power station "SEES WHERE HE CAN'T LOOK". Here he watches flame conditions in boiler furnace, stack smoke discharge, and water level in boiler on "Utiliscope" screens of control panel.

Centralized control is much more effective if it brings a SENSE OF REALISM into the control room . . . if the operator can actually see what is going on outside his range of vision instead of depending upon indirect interpretations of operating conditions. The electric power industry has accepted the "Utiliscope" as an important factor in achieving better centralized control (as shown above).

The "Utiliscope" has many other uses in industry where its low cost is quickly amortized by improved operation, greater safety or savings in labor. It is surprisingly simple and requires no special skill for installation and operation. Stability and reliability are exceptional. For additional information use coupon below.

"UTILISCOPE" RECEIVER

"UTILISCOPE" CAMERA

DIAMOND POWER SPECIALTY CORP. W
LANCASTER, OHIO

Please send me without obligation a copy of new Bulletin No. 1136W showing how the Diamond "Utiliscope" (Wired Television) is being used to cut costs, improve operations and promote safety.

Name_____

Company_____

Address_____

6701

DIAMOND POWER SPECIALTY CORP.
FIRST IN INDUSTRIAL TELEVISION
LANCASTER, OHIO
OFFICES IN 39 PRINCIPAL CITIES
Diamond Specialty Limited — Windsor, Ontario
Since 1903, Diamond has Manufactured Quality Equipment for Industry

commercial supervisor in the Kern district office at Bakersfield. **James P. Kastl,** a power sales engineer at Bakersfield, will replace Hothersall.

Joseph R. English, a veteran of 36 years of continuous service with Pennsylvania Electric Co and its predecessors, has retired as commercial manager of the company's Northwestern Division. He assumed the managerial post in 1952.

Edward Wimberly has been named chairman of the South Carolina Public Service Commission to succeed **F. B. Hines. Clyde F. Boland** has been made vice chairman of the commission.

Joseph C. Sonntag has been appointed assistant superintendent of power for Hartford Electric Light Co. Associated with the company since 1936, he has served in various capacities in the power production department, including electrical supervisor and departmental assistant.

OBITUARY

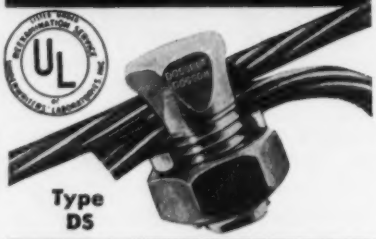
Edward J. Lavin, 62, assistant public relations director of Commonwealth Edison Co, died March 6 at Chicago. He had been with the company 40 years.

John C. Black, 58, manager for 25 years at Rogers, Ark., for Southwestern Gas & Electric Co, Shreveport, La., died at Rogers March 12.

Henry G. Wells, commissioner of the New Hampshire Public Service Commission, died March 5. Active in commission work throughout his life, Wells was first appointed to the Massachusetts Department of Public Utilities in 1919. Following his resignation from that commission in 1935, he served as legal consultant for Brazilian Tractor Light & Power Co in Rio de Janerio, Brazil. In 1953 he was appointed to the New Hampshire commission.

Oscar L. Mackell, 73, retired former member of the board of directors of Public Service Co of Colorado, died March 18 at Denver. Mackell retired May 1, 1951, after heading the customer department since 1922. He was a member of the board of directors from 1939 to 1943.

JOINED for LIFE
with DOSSON
SERVICE
CONNECTORS



Type DS

The choice of connectors is wide, but there's a big difference when you choose a Dosson. Years of testing under the worst weather and corrosion conditions give undisputed proof of Dosson's permanent grip. Makes quick, simple, efficient connections for solid and stranded conductors in sizes No. 14 to 1000 MCM. High contact pressure between conductors assures maximum security . . . eliminates maintenance. Check these important Dosson features:

1) High translation of torque by low coefficient of friction
2) High contact pressure
3) Free from vibrational loosening
4) Withstands high tightening torque
5) Maximum contact area
6) Made of high strength "DURONZE" alloy
7) Better conductivity
8) High corrosion resistance
9) Economical—usable over and over again
10) Dossert precision-manufactured

IN STOCK FOR IMMEDIATE DELIVERY!

50
YEARS OF
TECHNICAL
KNOW-HOW

DOSSERT REPRESENTATIVES IN PRINCIPAL CITIES

DOSSERT
MFG. CORP.
249 HURON STREET, BROOKLYN 22, N. Y.
SINCE 1904

Poster Campaign Wins Award for Kansas City Power & Light

Kansas City Power & Light Co has won the first award in the intermediate poster division of the second annual Creative Local Outdoor Advertising Awards Contest. The sponsor is the Outdoor Advertising Association of America which has its headquarters at Chicago.

The intermediate poster division was open to outdoor campaigns of local outdoor advertisers who used 24-sheet posters more than three but less than 12 months in 1953.

The utility also won the award in the last contest. One of the posters used in the winning campaign is shown above.

Sharing the award were R. J. Potts, Calkins & Holden, the advertising agency; Fred Haslam, the artist, of the utility company's staff; and General Outdoor Advertising Co. All have headquarters at Kansas City, Mo.

GPU 'Site Service' Offers Plant-Location Data

An industrial "Site-Service" has been established by General Public Utilities. The new service will provide detailed, confidential information on all available industrial sites and buildings in the system's area which covers 45% of Pennsylvania and 43% of New Jersey.

Site-Service also provides complete reports on transportation, natural resources, labor, water utility services, tax policies, and other plant location factors. The service is being offered through the office of the director of area development, William J. Jamieson, 67 Broad Street, New York 4, N. Y.

PUAA Entries Judged

Most of the judging for the various classifications of the Public Utilities Advertising Association Copy Contest has been completed. A total of 1,904 entries were received in 22 classifications. This does not include entries for the annual report classification which were not due until April 1. The winning awards will be reproduced in book form. And the winners will receive their certificates at the annual convention, May 13-14, at Boston. The contest is the oldest advertising competition in the United States.

Contest Entries Due

Entries are now due for the 15th Reddy Kilowatt Annual Report Contest. Closing date is May 10. Any business-managed electric company is eligible. Only requirement is that six copies of the company's 1953 annual report be sent to Reddy Kilowatt, Inc; 50 Church Street; New York 7, N. Y. Awards will be presented at the annual meeting of Edison Electric Institute, June 1-3, at Atlantic City.

SCANNING THE ADS

American Gas & Electric Co—Full-page newspaper ad addressed to companies seeking a plant location advises them that they can "save $10,000 worth of executive time in 10 minutes." The gimmick is a check list of plant location factors. Plant seekers are advised to check list and send it to the company with a request for an interview.

Connecticut Light & Power Co—Ad suggests this family game. Each player is to get a pencil and paper and list all the electric appliances in the home in fixed period of time. The ad lists 54 of them.

Pennsylvania Power & Light Co—"Robin's eye view of a woman cooking dinner electrically" shows robin watching woman sitting out on her lawn reading a newspaper.

Public Service Electric & Gas Co—Ad for electric blankets was illustrated at top with line cut of two sheep. Head read, "Nobody counts us any more since automatic electric blankets came in."

Washington Water Power Co—Ad commemorating 65th anniversary of company carried pictures of 102 30-year employees.

INDUSTRY RESEARCH PROGRAM is discussed by J. A. Longley, program chairman; J. H. Pengilly, PCEA president; Dr J. E. Hobson, Stanford Research Institute; and Dr W. A. Lewis, Illinois Institute of Technology, at PCEA Engineering and Operation Section conference

Research by Utilities Stressed

Educators tell PCEA Engineering and Operation Section electric companies must participate in new developments

Research activity within and supported by electric utilities is a must if the industry wishes to assure a future as glorious as its past. This challenge was presented by Dr J. E. Hobson, director, Stanford Research Institute, to the annual conference of the engineering and operating section of the Pacific Coast Electrical Association. Over 600 engineers registered for the conference, March 18-19, at San Francisco.

Minimum Research Budgets . . . Dr Hobson and the co-author of the presentation, Dr W. A. Lewis, Dean of the Graduate School, Illinois Institute of Technology, contend that the industry's business is not simply to provide energy. Electric companies must participate in new developments directly and through industry-wide agencies under their sponsorship and direction. He suggested a minimum budget of $7 million for basic research. This amount is only $1 for each $1,000 of company revenue or 7.5¢ per kw of installed capacity. Land, buildings, and equipment for a 700-man central laboratory could cost $7.5 million.

Discussion in the system generation group of supervisory vs automatic control was led by J. V. Kresser, Westinghouse Electric Corp, and A. R. Worthington, Pacific Gas & Electric Co. The choice must be based largely on the engineering and economic features of each particular application. In general, automatic is less expensive and the more simple system.

Employee Selection . . . Attitudes of potential and promotable employees are as important as aptitudes, said Harry McKnight, PG&E, in outlining a method for selecting the right man for the job. Where promotions are made internally, it is particularly important to keep a current talent inventory in order to fill vacancies in an orderly fashion.

Operating economies as effected by load assignments and transmission losses were discussed by H. R. Perry, PG&E, and Whitman Ridgway, General Electric Co. They considered first incremental generation costs and incremental transmission losses as penalty factors to be applied to scheduling of generation. In this way transmission losses can be included in the overall operating economy. Often high-cost generation near load centers may be more economical than low-cost remote from load centers.

Advantages of Covered Conductor . . . E. W. Greenfield, Kaiser Aluminum & Chemical Corp, pointed out these advantages of weatherproof covered wire which are inherent to its dielectric properties: less leakage to trees, fewer outages due to contact of conductors, greater protection to workers and the public, avoidance of outages due to foreign objects on conductors, and added safety to crews during operations under energized lines.

Covered conductor, he added, has a greater current-carrying capacity than a bare wire of the same size. He also cautioned that covered conductors have no actual voltage rating; so they should always be handled as if bare.

Standardization of pole line material means definite savings, agreed T. M. Bettersworth, PG&E; J. M. Culverwell, Kortick Manufacturing Co; and E. H. Clark, Southern California Edison Co. Among the savings are better control of quality from adequate specifications, less engineering time to produce specifications, lower manufacturing costs, less storage space, and better interchangeability among different makes of material. Company standards should follow those of industry to get the greatest savings.

Line Building . . . Production-line methods of building transmission and distribution lines were reviewed for three types of conditions. For small jobs, D. E. Rodgers said, Coast Counties Gas & Electric Co uses a line truck with five men and a two-man digger to set poles for both new construction and rebuilds. For 10-15-mile rural lines and 12-15-block new residential areas Arizona Public Service Co, according to R. D. Hulse, uses mass-production methods and gets more work done with the same number of men as before.

Gordon Sparrowe, PG&E, told of using small crews of specialists to clear rights-of-way, dig holes, set anchors, frame and set poles, string wire, and hang transformers for rural extensions. P. C. McCann, Southern California Edison Co, said that in extensive residential areas distribution lines are being built on a production-line basis. Sometimes framing, mounting of transformers, and stringing of

wire are done before the poles are set.

The underground group heard James B. Bowen, San Diego Gas & Electric Co, report that the use of reusable steel forms for manhole construction has saved money. A set of forms cost $700 but is still usable for 100 applications. A typical manhole requires 35 man-hours from forming to stripping of forms. Use of precast manholes by Arizona Public Service Co, as described by Paul Rist, holds cost of a 10x10x7.5 ft manhole to $1,660 completely installed.

Turbine Trends . . . Reheat, increase in steam temperature, and growth of average size of machine from 49 to 125 Mw are modern trends in steam turbines, D. W. R. Morgan, Jr, Westinghouse, told the steam generation group.

Gas turbines would be ideal drives for high-pressure boiler feed pumps as steam pressures increase, C. M. Wright, GE, pointed out. The net effect would be an improved overall net heat rate. In combination with a supercharged boiler in a gas-turbine, steam-turbine station, the boiler furnace would replace the combustion chamber of the gas unit. The heat rate would be improved by 5% over a straight steam cycle.

Use of plastic pipe in steam plants should be considered, advised R. E. Deshon, Republic Supply Co. It is especially suitable where corrosion is to be avoided or where ease of installation saves enough to make up for its added cost. Principal limitations of plastic pipe are low temperature range (180 F, max), low pressure (200 psi max), and reduced physical strength.

Present and latest types of 15 and 50-amp meters will continue to meet with adequacy all residential loads in the foreseeable future. This remark by E. B. Kipp, San Diego G&E, fairly well expressed the consensus of the meter group's discussion of meter adequacy. However, there was a feeling "answer is one meter rating" to cover present and future loads.

REA Loan Approved

Rural Electrification Administration has approved a $2,805,000 loan to Southern Maryland Electric Cooperative Inc, Hughesville, Md., to enable the co-op to extend service to some 2,400 new consumers.

Power Allocation Talks Start

Reclamation and Interior officials meet with applicants for hydropower in Eastern Division of Missouri River Basin

Reclamation Bureau and Interior Department opened a series of conferences today with applicants for federal power from five hydroelectric projects in the Eastern Division of the Missouri River Basin.

Meeting today (April 5) is being held at Sioux Falls, S. D. Conferences are scheduled for April 6 at Bismarck, N. D., and April 7 at Billings, Mont. A final meeting will be held April 9 at Sioux Falls to coordinate the conclusions of the earlier meetings.

Main purpose of the meetings is to give Reclamation officials some idea of how the available power should be allotted. Following this series, it is expected that negotiations will begin on the actual power contracts with applicants.

The power is available to applicants in Montana, North and South Dakota, and portions of Minnesota, Iowa, and eastern Nebraska.

Representing Reclamation Bureau and Interior Department at the meetings are Assistant Secretary Fred G. Aandahl, Assistant Commissioner of Reclamation Harvey McPhail, and several members of Reclamation's power division.

Situation is that there likely will be a sizable surplus of federal power in the western portion of Eastern Division, and a corresponding severe shortage in the eastern area. Because of the lack of transmission facilities and geographical factors, Reclamation does not plan to integrate the whole area in a single grid.

In the western area of the division, Reclamation figures there will be 94,000 kw of firm power available for contract by 1956. Of this, it has commitments already in existence for 24,460 kw, of which 5,000 kw is to non-preference customers. Applications have been submitted for an additional 40,350 kw of the power. That leaves a surplus of 28,990 kw. It is expected that this surplus power will be available to utilities at fixed rates.

The situation in the eastern area of the Eastern Division is just the reverse. Estimated total firm federal power supply in this area in 1958 is 531,000 kw, of which 341,125 kw is presently committed. This leaves 190,000 kw of power available. Applications for this 190,000 kw by preference and non-preference customers now total 562,982 kw.

New Generating Plant in the Deep South

Alabama Power Co's Barry Steam Plant near Mobile recently started up its first 125,000 kw unit. Second 125,000 kw unit is scheduled to go on the line within the next few months.

MANUFACTURERS AND MARKETS

E. Germans Vie . . .

. . . for Arab market by featuring heavy industry equipment, and consumer goods at Cairo, Egypt exhibit

An obvious maneuver to scuttle thriving West German trade in the Middle East has been initiated by the Soviet-dominated East German republic with the opening of a costly industrial exhibition in Cairo, Egypt.

Purpose of the fair, in the words of Herr Fritz Koch, special representative of the "German Democratic Republic" in the Middle East, is to tell Egyptians and Arabs that "East Germany is in a position to deliver and set up complete factories and works for sugar, cement, hydro-electric power, and so on."

Challenge to West Germans . . . East Germany concluded a trade and payments agreements with Egypt and Lebanon last year. Since then the Soviet-dominated Germans have been vieing to replace West Germany in heavy industry equipment and consumer goods.

The giant fair includes $3 million worth of materials, weighing more than 600 tons. A team of 168 German scientists and specialists from East Germany worked several weeks on the giant exhibition.

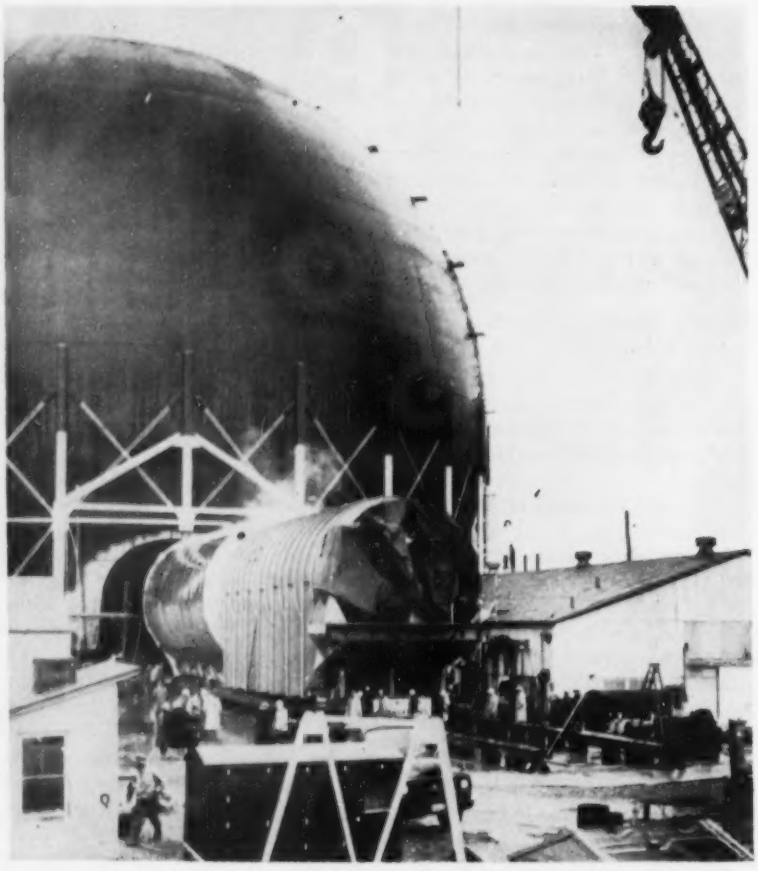
Displays at the fair include sections on electro-technical equipment, machine tools, medical goods, chemical equipments, and textile machinery.

The electro-technical section includes a 5,000-v motor, instrument transformers, and models of power distribution equipment. In the low voltage field, portable Diesel engine-driven generators were featured.

Makes Supply Pledges . . . This section promised to supply the following:

Electric motors and generators of every capacity, transformers, high and low voltage switchgear, electric welding machines, coal and silicon carbide products, industrial electric furnaces, Diesel-electric stations, radio transmitting and receiving equipment, carrier-frequency telephones, electric measuring instruments, discharge and compound valves, electric home equipment, and lighting fixtures.

Industrial high frequency apparatus: for surface hardening, melting, welding, as well as electrical welding of plastics; electrical controllers, radio, and television sets.



Hull Moves Into A-Submarine Sphere

General Electric Co workmen are shown rolling the 1,300 ton model hull for U. S. S. Sea Wolf, set to be the Navy's second atomic-powered submarine, into a steel sphere built last fall at West Milton, N. Y., by the company for test of an atomic power plant for submarines. The hull is being moved at the rate of ten feet an hour through a temporary hole cut in the bottom of the sphere.

2 U. S. Firms Awarded BPA, Reclamation Orders

Two U. S. firms were recently awarded contracts by Interior agencies for nearly $1 million worth of electrical transmission equipment—beating out foreign competitors which had submitted lower price bids.

Bethlehem Pacific Coast Steel Corp of San Francisco won a $829,236 contract for approximately 3,200 tons of steel for transmission towers. These towers are for Bonneville Power Administration's 110 mile line from McNary Dam to southwestern Oregon.

A $108,522 contract went to Pennsylvania Transformer Co of Canonsburg, Pa., for one 15,000 kva power transformer to be used at Bureau of Reclamation's Groton substation near Webster, S. D.

American Ligurian Co, agent for a German manufacturer, had submitted a $630,754 price bid for the tower steel, but transportation costs, custom

duty, and a 25% differential added under Buy American regulations hiked the foreign bid to $948,285 for comparison purposes.

On the transformer contract, an Italian firm had submitted a price bid of $105,540, but upon evaluation this bid was considered higher than the U. S. bid.

Westinghouse Offers 2 Heat Pump Models

Westinghouse Electric Corp recently put on a demonstration of its heat pump in the Potomac Electric Power Co auditorium in Washington, D. C.

The heat pump, which Westinghouse now has in production, is currently available in two sizes—3 and 5 hp. The 3-hp model will service a house of five or six rooms; the 5-hp model takes care of eight or nine. Under ordinary circumstances, a unit installed will run around $2,800 for the small one and $3,500 for the larger model. These costs are expected to come down when production gets further along. Initial cost and operating cost are figured to be roughly competitive with the cost of installing and running separate heating and air conditioning systems.

Main unit takes up about 10 sq ft of floor space and stands 6 ft high. It can be set in a service room, basement, garage. The whole works comes in one package.

MANUFACTURING BRIEFS

Entry of a consent judgment in Federal District Court, Trenton, N. J., ends an 11-year-old antitrust suit against General Electric Co and its foreign subsidiary, charging price fixing and monopoly of fluorescent lighting. In the judgment, GE and its foreign affiliate, International General Electric Co, agreed to let their 250 patents be used royalty-free and to cancel all foreign and domestic restrictive agreements.

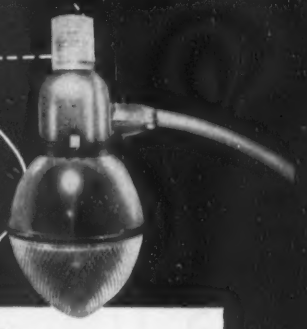
Sylvania Electric Products, Inc, has started manufacturing operations at its new 422,000-sq ft television set assembly plant at Batavia, N. Y., the company's largest factory under one roof. First of four assembly lines is now producting TV sets, employing

When you think:

Fully Automatic Light Control

You should say:

LUMATROL®
PHOTOELECTRIC
LIGHT SWITCH



NEW! OMNI-DIRECTIONAL SENSITIVITY—INTEGRATES LIGHT FROM ALL DIRECTIONS!

Here's Why:

In simplicity, efficiency, and continuing low cost, the LUMATROL Photoelectric Light Switch is unmatched by any other light control device!

A Few Facts:

The LUMATROL Photoelectric Light Switch rates first on all twelve specifications normally applied to this type control. These include size, weight, volume, sensitivity, time delay, power consumption, safety, number and type of parts, and method of installation.

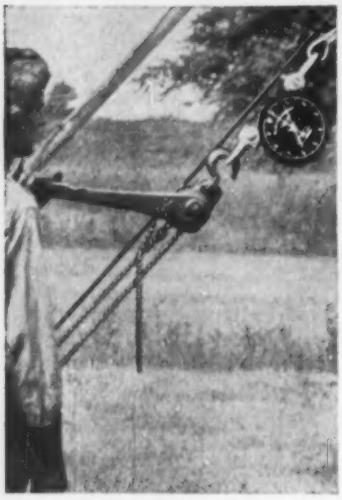
Most Important:

LUMATROL is sensitive to the average of existing light, integrating it from all directions. This exclusive feature greatly increases both efficiency and economy of the lighting system. Installation is quick and simple . . . just plug it in . . . and there are no relays, no mercury switches or troublesome condensers to maintain.

WRITE FOR TECHNICAL BULLETIN

micro balancing
INCORPORATED
GARDEN CITY PARK, L. I., NEW YORK
®Trade Mark Reg. U.S. Pat. Off.

you play it **SAFE** with **Safety-Pulls**



Just as important as the time- and labor-saving advantages of Coffing Safety-Pull Ratchet Lever Hoists is the way each one protects your men from injury . . . your equipment from damage. Here's why:

Load cannot slip even if handle is accidentally released — because of dual Ratchet and Pawl principle, developed by Coffing and an outstanding Coffing advantage for over a quarter of a century.

Load is held positively at all times — there is no friction brake to slip or freeze.

Hooks will not break or straighten out.

"Safety-valve" handle will bend before any other part of hoist gives way.

Safety-Pulls are single-chain tested at 100 percent above warranted, rated capacity.

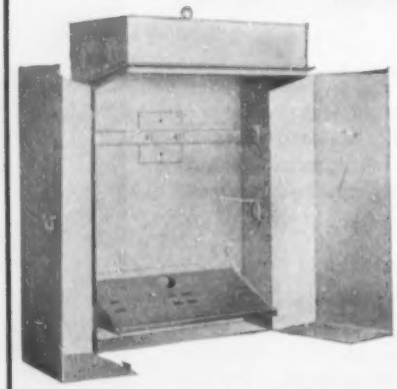
Find out more about how Coffing Safety-Pulls provide extra protection on the job. Write for Bulletin E4SP.

Coffing Safety Pull Ratchet Lever Hoists
2 coil chain models, ¾ and 1½ tons
10 roller chain models, ½ to 15 tons

Quik-Lift Electric Hoists
Hoist-Alls • Mighty-Midget Pullers
Spur-Geared Hoists
Differential Chain Hoists
I-Beam Trolleys
Load Binders

COFFING HOIST COMPANY
ORIGINATORS OF RATCHET LEVER HOISTS
DANVILLE, ILLINOIS

KEES Transformer Housing For 4 Transformers



2 CURRENT . . .
2 POTENTIAL . . .

No. 3624-14

- Accommodates high insulation types of GE & Westinghouse transformers, ratio 20 to 1, 2300-volt primary.
- Mounting-bar which supports the two current transformers may be attached vertically or horizontally.
- 16-Gauge zinc-grip sheet steel, welded construction throughout. Doors hinged on both sides, with hold-backs and latch.
- The two potential transformers rest on shelf which slopes to front of housing — gives added clearance, makes installing and replacing easier.
- Knockouts for insulator bushings are spaced to coordinate with current transformers mounted either in vertical or horizontal position.

Manufacturers of Meter Boxes, Pull Fuse Switches, Meter Test Blocks, Portable Handi-Lites

"SINCE 1874"

F. D. KEES MFG. CO.
BEATRICE · NEBRASKA

Write P. O. Box 522 for Free Catalog

230 workers. When the plant's other three lines go in operation in June, total employment will be approximately 1,500.

State Department has disclosed that the U. S. will purchase 100,000 tons of copper from Chile for this country's stockpile of strategic materials. The stockpile purchase, which officials estimated would be made at 30¢ a lb and cost $60 million, ends a long-term deadlock in purchases of the red metal from Chile.

SALES ASSIGNMENTS

COMPANY STAFFS

Allis-Chalmers Manufacturing Co Milwaukee, has appointed C. F. Kucera and Harold H. Ackmann as regional representatives for transmission equipment in the Southeast and Central regional offices. Kucera, previously assistant sales manager in the firm's switchgear department, will make his headquarters at Atlanta. Formerly a sales engineer in that same department, Ackmann will be headquartered in Cleveland.

General Motors Corp's Rochester Products Division has named Harold Stahl, sales engineer, as head of its new regional sales office in Detroit, which will service Michigan area customers with welded and brazed GM steel tubing. The new office is located at 8316 North Woodward Ave.

Benjamin Electric Manufacturing Co, Des Plaines, Ill., has assigned R. H. Hiller, formerly a district representative for Curtis Lighting, Inc, to its Atlanta, Ga., staff. A. A. Michel, associated with the lighting industry for many years, was appointed head of Benjamin's Nashville territory. Vern Winn, formerly with Square D Co as a field engineer, has joined the company's Detroit staff.

REPRESENTATIVES

Reliance Electric & Engineering Co has announced that C. P. Lohr Co, its manufacturing agent in St. Louis and Kansas City, has named William L. Casey as a field sales engineer in the St. Louis office. Casey, who comes to the Lohr organization from Reliance, will cover metropolitan St. Louis, eastern Missouri, and southern Illinois.

MEETINGS CALENDAR

***American Institute of Electrical Engineers**
6th Conference of Subcommittee on Rubber-Plastics Industries of Committee on General Industry Applications, Mayflower Hotel, Akron, Ohio, April 5-6; Conference on Feedback Control, Claridge Hotel, Atlantic City, N. J., April 22-23; Northeastern District Meeting, Hotel Van Curler, Schenectady, N. Y., May 5-7; Appliance Technical Conference, Subcommittee on Domestic Appliances of Committee on Domestic-Commercial Applications, Morrison Hotel, Chicago, May 17-19; Fourth Welding Conference in cooperation with American Welding Society, Hotel Schroeder, Milwaukee, May 19-21; Con-

ference on Telemetering, Morrison Hotel, Chicago, May 24-26; Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, June 21-25; Committee on Petroleum, Conference on Electrical Applications in Petroleum Industry, Mayo Hotel, Tulsa, Okla., Sept. 28-29; Fall General Meeting, Chicago, Ill., Oct. 11-15.

*Indiana Electric Association
14th Annual Young Men's Utility Conference, Gary Hotel, Gary, Ind., April 5-6; Annual Convention, French Lick Springs Hotel, French Lick, Ind., Oct. 6-8.

Edison Electric Institute
20th Annual Sales Conference, Edgewater Beach Hotel, Chicago, April 5-8; EEI-AGA Accounting Conference, Hotel Statler, Boston, April 12-14; Industrial Relations Committee, Netherlands Plaza Hotel, Cincinnati, Ohio, April 15; Conference of Public Utility Fleet Operators, Sponsored Jointly by EEI Transportation Committee and AGA Automotive-Mobile Equipment Committee, Mount Royal Hotel, Montreal, Que., April 20-23; Prime Movers Committee, Electrical Equipment Committee, and EEI-AEIC Meter and Service Committees, May 3-4; Hydraulic Power and Transmission-Distribution Committees, May 4-5, All at Edgewater Beach Hotel, Chicago; 22nd Annual Convention, Atlantic City, N. J., June 1-4; Accident Prevention Committee, Mark Hopkins Hotel, San Francisco, July 1-3.

Pacific Coast Electrical Association
Administration Services Section, Hotel Claremont, Berkeley, Calif., April 7-8; Annual Convention, Hotel Del Coronado, Coronado, Calif., May 19-21.

Missouri Valley Electric Association
Engineering Conference, President Hotel, Kansas City, Mo., April 7-9.

Louisiana Polytechnic Institute
2nd Annual Instrumentation Conference, Ruston, La., April 8-9.

Northwest Electric Light & Power Association
Engineering and Operation Sections, Olympic Hotel, Seattle, Wash., April 15-17; Business Development Section, Hotel Boise, Boise, Idaho, May 10-12; Accounting and Business Practice Section, Davenport Hotel, Spokane, Wash., May 20-21; Personnel Section with EEI Industrial Relations Committee, Multonah Hotel, Portland, Ore., July 12-14.

A. & M. College of Texas
7th Annual Conference for Protective Relay Engineers, Department of Electrical Engineering, College Station, Tex., April 26-28.

National Association of Electric Companies
Annual Meeting, Mayflower Hotel, Washington, D. C., April 29.

*Pennsylvania Electric Association
Joint Spring Meeting of Relay Committee and Systems Operation Committee, Bedford Springs Hotel, Bedford Springs, Pa., May 6-7; System Planning Committee, Hotel Hershey, Hershey, Pa., May 10-11; Transmission and Distribution Committee, Fort Bedford Inn, Bedford, Pa., May 13-14; Prime Movers Committee, Castleton Hotel, New Castle, Pa., May 17-18; Electrical Equipment Committee, Lord Baltimore Hotel, Baltimore, Md., May 24-25.

Southeastern Electric Exchange
Spring Meeting, Engineering and Operation Section, Sans Souci Hotel, Miami Beach, Fla., May 6-7.

American Society of Mechanical Engineers
Semi-Annual Meeting, William Penn Hotel, Pittsburgh, June 20-24; Fall Meeting, Schroeder Hotel, Milwaukee, Wis., Sept. 8-10.

World Power Conference
Sectional Meeting, Rio de Janeiro, Brazil, July 25-Aug. 10.

Pan-American Federation of Engineering Societies
(UPADI), Third Convention, Sao Paulo, Brazil, Aug. 2-12.

*Public Information Program
Workshop Conference, Chase Park Plaza Hotel, St. Louis, Oct. 28-29.

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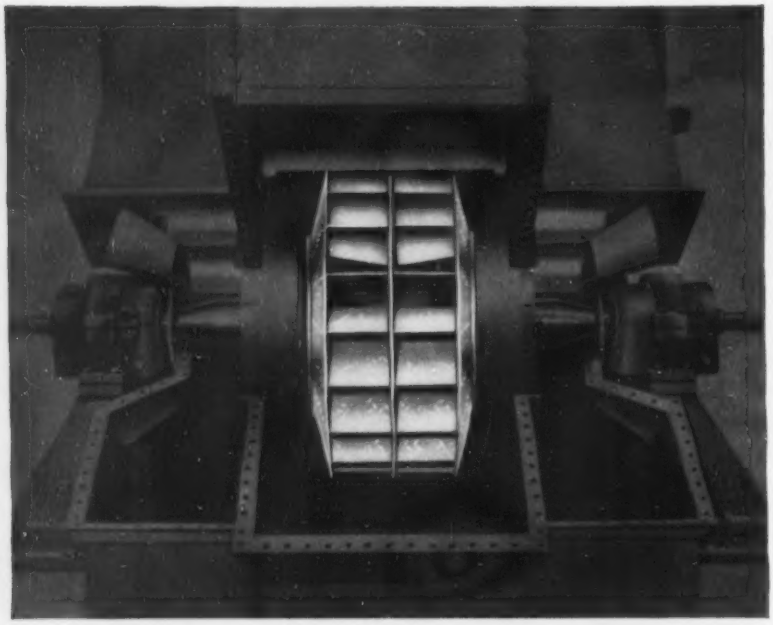

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Appliance Tax

(Continued from page 95)

philosophy of reducing excise taxes which are in excess of 10% to 10%," said Capehart. "We are now on a basis where a fur coat has the same excise tax as a refrigerator. If there ever was any sense in imposing excise taxes in varying degrees, 10, 15, 18, 20%, the same principle is applicable today."

In the case of reductions in retailers and manufacturers excises, an article is not to be considered sold prior to April 1, 1954, unless possession to the article passes before that date. This was designed to cover "lay-away" type sales. On installment sales, all installments falling due after April 1 would reflect the rate of tax in effect after that date.

The committee agreed to the floor stock refund provided by present law for electric light bulbs, but provided that the manufacturer is to have four rather than three months after the reduction date in which to file his claim for refund. However, the retailer or wholesaler must still submit his request for a refund to the manufacturer within three months of the reduction date.

Supports 12% Rate Hike for Hauling Coal in Ohio

Ohio Supreme Court has affirmed a 12% increase on rates granted railroads for hauling coal within the state.

Ohio Public Utilities Commission had granted the increase to a limit of 40¢ a ton on May 7, 1953. However, Toledo Edison Co, Cleveland Electric Illuminating Co, Ohio Coal Association, and the North American Coal Corp appealed to the higher court, contending the PUC order allowing the increase was unreasonable and unlawful. They claimed the commission set bituminous coal freight rates without requiring the railroads to submit evidence of value of their property used in state for coal transportation.

The high court in an unanimous decision said the increase was neither unreasonable nor unlawful. In fixing the freight rate for the transportation of a single commodity, the court held, it is not necessary for PUC to base its judgment only on property valuation and operation costs of railroads.

REA Co-ops Taxed

Michigan Gov Williams signs amendment making them subject to receipts tax

REA electric cooperatives and certain other enterprises previously exempt from Michigan's business receipts tax have been made subject to the levy by an amendment signed recently by Gov G. Mennen Williams.

Business Receipts Tax Bill . . . The business receipts tax bill was passed last year to cover virtually all taxpayers, whether individual or corporate. Taxpayers are levied on gross receipts by at least 50%. The 50% can be further reduced by taking deductions for payments for property, services, privileges, or facilities necessary for the operation of the business, as well as rentals. Interest, cash discounts allowed and taken by buyers, and taxes or other governmental levies except income taxes are also deductible.

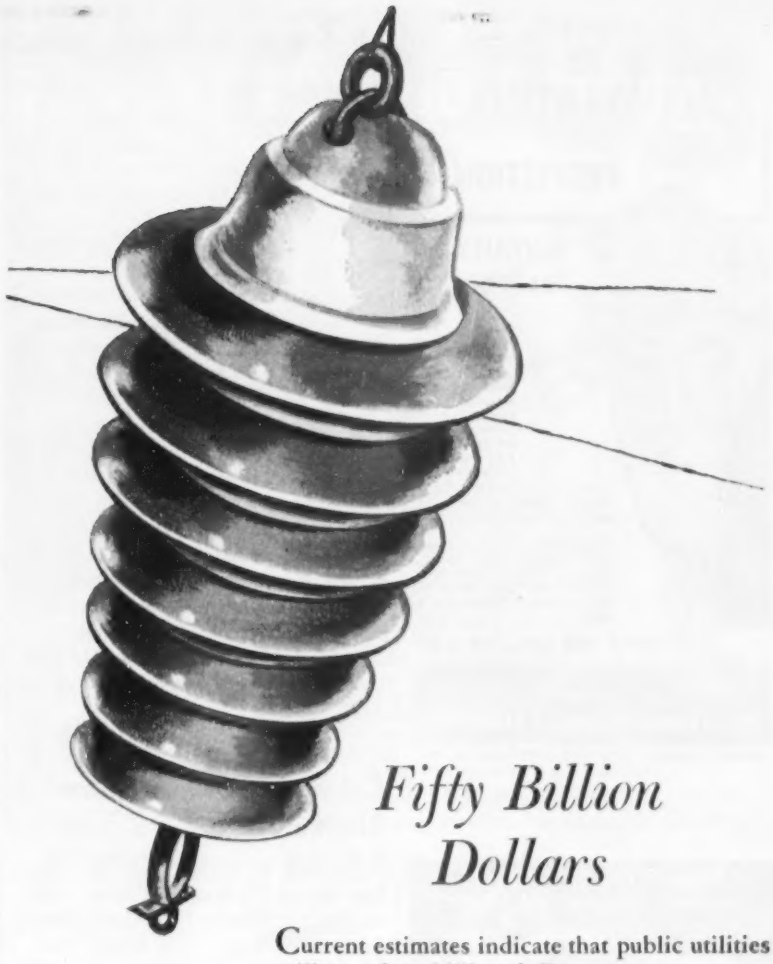
After deductions are taken, the balance is termed the "adjusted gross receipts." From that figure, each taxpayer gets an exemption of $10,000. That, coupled with the automatic 50% reduction, exempts $20,000 income.

One Mill Tax For Utilities . . . The tax rate for all taxpayers other than public utilities is four mills of the adjusted receipts which are taxable. Public utilities, however, pay at the rate of one mill. This differential was permitted because tax burdens on utilities are generally reflected in increased rates for their essential services.

The recently-signed amendment to the bill now brings REA co-ops and most other previously exempted businesses or professional people under coverage. The bill expires in March, 1955.

Fair Rate on Operations Asked by PS of Colorado

Public Service Co of Colorado has asked the Colorado Public Utilities Commission to determine the company's fair evaluation and then fix a fair new rate on the company's elec-



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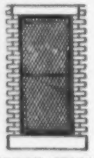
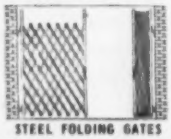


WINDOW GUARDS



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tric and steam operations.

Officials of the company in their application did not estimate the amount of the rate increase needed. A spokesman said: "All we are doing is to request a thorough study and the subsequent establishment of a fair return rate. We cannot suggest the rate. This is a PUC decision."

J. E. Loiseau, company president, said the petition was the first in the company's history for an increase. All previous changes in the company rate schedule have been downward. The last was a 12.5% reduction in the electric power rates in 1947.

Loiseau said in a statement that "it is with regret we must take this action, as we have been hopeful we could weather the prevailing higher prices without an increase . . ."

He said rising costs were the sole reason for the petition. He reported wages and salaries, which constitute 32% of the company's overhead, have increased 85% in 10 years. He said that taxes have increased 40% since 1947.

Colorado Co-op Votes a Blanket 15% Rate Hike

Colorado's largest co-operative, Southeastern Colorado Power Association, has voted a 15% blanket electric rate increase. The higher rates, effective March 1, were approved at the annual meeting in La Junta.

Five board members, including all the incumbent officers, were defeated for re-election. They included Lewis Amend of Rocky Ford, president of the Southeast Association and also president of the Colorado REA Association. Amend is a nationally known figure in the REA. Also defeated were Christian Wunsch, vice president of La Junta, Neill B. McGrath, secretary-treasurer of Lamar, and directors Carl Bersagel of Fowler and Robert A. Blooding of Eads.

New directors elected were W. K. Burchfield of Walsh, George W. Bevers of La Junta, J. P. McKeever of Holly, Andrew Vanotti of Walsenburg and Roy Wieber of Sheridan Lake.

The association has 6,417 members in 13 southeastern Colorado counties. Nearly 2,400 members were represented in attendance or by proxy. The election was decided by a bloc of 1,300 proxy voters gathered in Prowers, Baca, and Kiowa counties.

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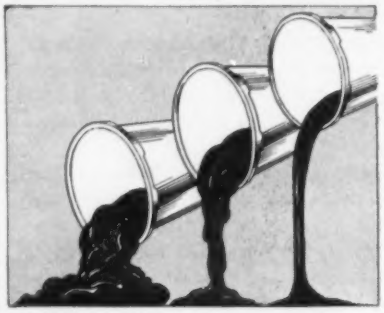

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the Southern Colorado Power Co, a private utility, and municipal plants at Lamar, La Junta and Trinidad. Power in 1952 cost it an average of 10.8 mills per kw and 10.9 mills in 1953.

Drops Competitive Bids for Toledo Edison Bonds

Ohio Public Utilities Commission recently decided to permit Toledo Edison Co to issue $14 million in first mortgage bonds without taking competitive bids. Proceeds will finance in part the company's $18.5 million construction program in 1954, with the rest coming from revolving bank loans, a company spokesman said.

The company negotiated the sale of the 30-year bonds bearing 3⅜% interest to a syndicate of 13 firms headed by the First Boston Corp, and then Halsey Stuart & Co, Inc, Chicago, contended that the company would get a better price and financing terms if bids were taken.

The commission, after hearing testimony, said Halsey Stuart failed to prove the utility did not get a fair and reasonable price for the bonds at a negotiated sale.

Seeks Evergreen PS

Colorado Central Power Co has applied to the Colorado Public Utilities Commission for authority to acquire the Evergreen Public Service Co, which serves mountain communities west of Denver. Colorado Central would pay about $500,000 for the Evergreen firm, which serves 2,000 electric customers.

FINANCIAL BRIEFS

Public Service Co of New Hampshire has made arrangements to acquire New Hampshire Electric Co and its subsidiary, Kittery Electric Light Co, from the New England Gas & Electric Association. Sale is subject to federal and state commissions approval.

Boston Edison Co is planning to undertake "a substantial amount of new financing during the latter half of 1954" . . . **Empire District Electric Co** is asking stockholder approval on April 13 to increase the authorized common stock from 750,000 shares

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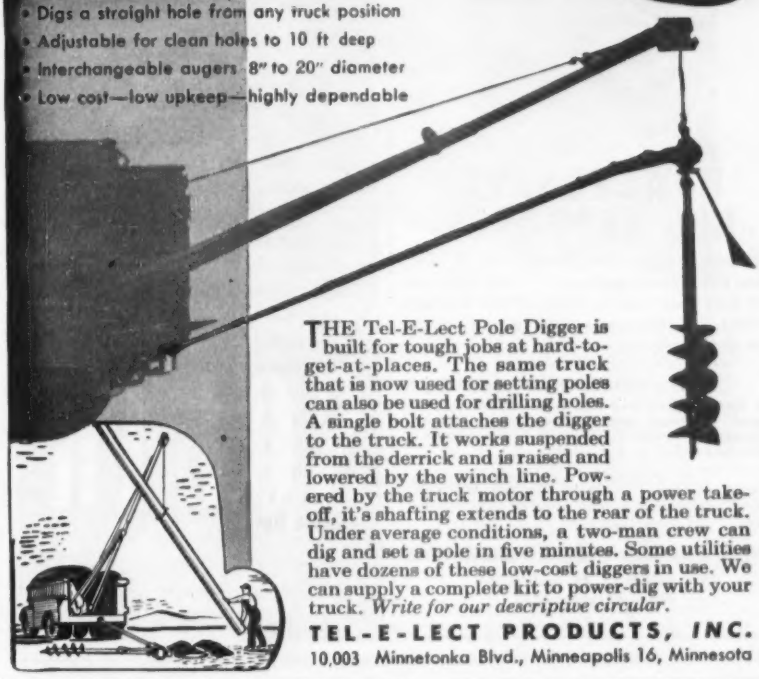

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to 1 million shares and the $100 par preferred from 60,000 shares to 120,000 . . . **California-Pacific Utilities Co** is planning to sell $2 million 4% first mortgage bonds to John Hancock Mutual Life Insurance Co . . . **Oklahoma Gas & Electric Co** has sold 65,000 shares of 4.44% cumulative $100 par preferred stock to institutions through Kuhn, Loeb & Co.

Commonwealth Edison Co has announced it will distribute to its stockholders, in annual installments over a period of years, Edison's holdings of Northern Illinois Gas Co common stock. First distribution will be made in August to stockholders of record on a date in the latter part of June.

Municipally-owned utilities' officials in Michigan seek easier financing through the medium of a bill passed by the Senate recently. The bill, an amendment to the state revenue bond act, would permit municipal utilities in 40 Michigan cities to authorize revenue bond issues without a vote of the people who pay the bills. It would eliminate the necessity to use general obligation bonds or mortgage revenue bonds to finance construction improvements.

Columbus, Ohio, City Council has authorized the issuance of $750,000 in bonds for a new generator and other equipment for the municipal plant . . . **Troy, Ohio, City Council** has approved the issuance of $500,000 in mortgage revenue bonds to finance light plant improvements and system additions.

Louisville Gas & Electric Co has received Kentucky Public Service Commission approval to buy certain facilities in the annexed section of Brandenburg for a reported $8,000 . . . **Florida Power Corp** has been granted a new 30-year franchise by the Zephyrhills City Council.

Northern Quebec Power Co has sold 50,000 shares of $50 par 5½ cumulative preferred stock . . . **Bluffton, Ohio, City Council** has approved legislation to advertise for bids for sale of the municipal plant in that city.

Central Maine Power Co's board of directors has approved the sale of 50,000 shares of $100 par preferred stock to institutions.

CATALOGS • BULLETINS

● **UNDERGROUND CONDUIT:** An eight-page manual, "How to Use Soapstone OCT-O-DUCT", illustrates methods of preparing trenches, constructing duct structures and manholes, and encasing for flat-sided underground conduit. Soapstone Duct Co, 110 Linfield Dr, Menlo Park, Calif.

● **THERMOMETER BULBS:** Catalog 5701 describes resistance thermometer bulbs of high speed, marine, room temperature, and sanitary types, for temperature spans as narrow as 20F. Minneapolis-Honeywell Regulator Co., Wayne & Windrim Ave, Philadelphia 44, Pa.

● **LIGHTING EQUIPMENT:** Pole units and wall and wood pole brackets, which provide for ground level servicing of lighting equipment, are described in a 32-page catalog, PB-53. Thompson Electric Co, 1111 Power Ave, Cleveland 14, Ohio.

● **INVENTORY OPERATIONS:** Folder EL148 gives details of an electronic machine which maintains 39,000 3-digit tally or inventory totals, while accepting 9,000 entries per hour from 10 operators. Machine permits vital reports to be secured in 13 minutes. Remington Rand Inc, 315 4th Ave, New York 10, N. Y.

● **MOVABLE WALLS:** A 68-page catalog presents detailed information on flexible interiors for offices, factories, schools, etc. Mills Co, 965 Wayside Rd, Cleveland 10, Ohio

● **TRANSFORMERS:** Price catalogs are available for a complete line of transformers. The equipment is listed under power or distribution transformers. Central Transformer Corp, Pine Bluff, Ark.

● **ELECTRIC HEATING:** Industrial electric heating applications and methods are described in a 32-page booklet, "101 Ways to Apply Electric Heat." Edwin L. Wiegand Co, 7513 Thomas Blvd, Pittsburgh 8, Pa.

● **METAL ASSEMBLY:** Bulletin 142 is a four-page publication listing various custom-built metal products—enclosures and cabinets—of steel, aluminum, and other alloys. Falstrom Co, 44 Falstrom Court, Passaic, N. J.

● **MINIATURE METERS:** Data sheet giving performance information on miniature side indicating panel meters is now available. International Instruments Inc, P. O. Box 2954, New Haven 15, Conn.

● **AIR FILTERS:** A 12-page publication, Bulletin 500, contains specifications and engineering and performance data for air filters designed for large air volume. Dollinger Corp, 11 Centre Pk, Rochester 3, N. Y.

● **4-WAY HYDRAULIC VALVE:** Bulletin 25 describes ¼-in., directly operated, 4-way valves, solenoid controlled. Pantex Manufacturing Corp, Pawtucket, R. I.

● **LOOM SWITCH:** A new, lint-tight, loom switch mountable on looms, wall, or pedestal is described in Bulletin GEA-6001. General Electric Co, Schenectady 5, N. Y.

● **FLUORESCENT FIXTURES:** An eight-page catalog is available with information on commercial and industrial fluorescent fixtures and troffers. Smithcraft Lighting Division, Chelsea 50, Mass.

● **TIME RECORDERS:** Two folders are now available that discuss equipment used to record employees' in and out attendance time as well as the amount of time

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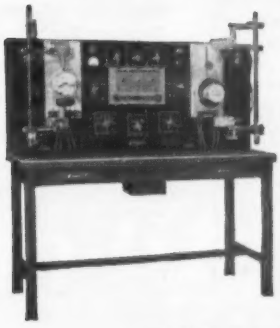

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spent on individual jobs during working hours. International Business Machines Corp, 590 Madison Ave, New York 22, N. Y.

● **CELLULAR GLASS INSULATION:** Physical properties, characteristics, and performance data of cellular glass insulation are covered in a new 24-page catalog. Pittsburgh Corning Corp, One Gateway Center, Pittsburgh 22, Pa.

● **EQUIPMENT CATALOG:** Equipment produced by General Radio Co is outlined in their Catalog N. Equipment specifications and price are included. General Radio Co, 275 Massachusetts Ave, Cambridge 39, Mass.

● **THERMOSTATIC BIMETALS:** A 36-page booklet describes 22 uses of bimetal in temperature responsive devices and gives engineering data for element design and selection. W. M. Chace Co, 1654 Beard Ave, Detroit 9, Mich.

● **BRACKET:** An 8-page catalog, No. 853, describes a complete line of quick mounting brackets for support of troughs and conduit. Dimensional drawings are given. Rakit Corp, 711 S. 50th St, Philadelphia 43, Pa.

● **GENERAL CATALOG:** A wide variety of products, such as steel shelving, storage bins, cabinets, work benches, office furniture, ladders, stools, and trucks, are shown in 32-page catalog 1200-R. Red Tiger Products, Inc, 20 N. Wacker Dr, Chicago 6, Ill.

● **PNEUMATIC TOOL ACCESSORIES:** Folder T-11-3P describes accessories for pneumatic tools, such as moil points, clay spades, and asphalt cutters. Brunner & Lay, Inc, 9300 King St, Franklin Park, Ill.

● **VALVE ORDERING:** An 8-page reprint from Petroleum Processing, "How to Get What You Need When You Order a Valve," lists and explains data needed by the supplier from the user when ordering valves. Cooper Alloy Foundry Co, Hillside, N. J.

● **FANS:** Catalog No. 60, 4 pages, illustrates industrial fans, including automatic wall shutters. Valley Fan Manufacturing Co, Fort Valley, Ga.

● **SOLDERLESS CONNECTORS:** Five sizes of sleeves for connections or repairs in heating elements, hot plates, automotive wiring and other uses are described in catalog sheet. Mend-it Sleeve Manufacturing Co, 136 Bonita Ave, Piedmont 11, Calif.

● **QUICK BREAK INTERRUPTER:** An 8-page booklet, "A Quick Break Interrupter Switch," describes the Type "QB" air switch attachment rated from 15 kv to 161 kv. Delta-Star Electric Div, H. K. Porter Co, Inc, 2437 Fulton St, Chicago 12, Ill.

● **AUTOMATIC TRANSFER SWITCHES:** Automatic transfer switches, engine-generator starting units, differential relays, time-delay relays, and complete control panels, designed to RETMA standards, are described in Publication No. 528, "When Normal Power Fails . . .", 40 pages. Automatic Switch Co, 391 Lakeside Ave, Orange, N. J.

● **MECHANICAL LINKAGE:** A 16-page bulletin, No. 500, describes the Teleflex system of transferring linear or rotary motion over a flexible or devious path. Applications and procedure for laying out a control or linkage are also given. Teleflex, Inc, P. O. Box 69, 125 S. Main St, North Wales, Pa.

● **AC MOTORS:** A 6-page catalog includes a motor selection guide. The Brook line includes single-phase capacitor and polyphase squirrel-cage motors from 1 to 50 hp. Brook Motor Corp, 3555 W. Peterson Ave, Chicago 45, Ill.

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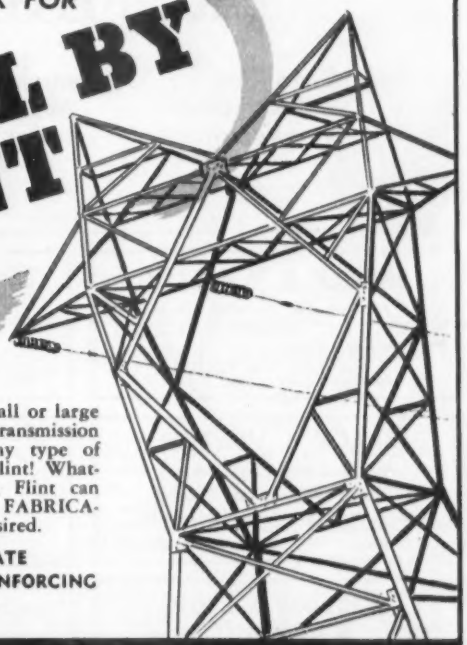

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LETTERS

Scholarship Data

To the Editor:

The article on our scholarship program on page 114 of your Feb. 22 issue has me a little groggy. Unfortunately, there has been some misinterpretation. This is discussed in the following:

1. The scholarships are not necessarily awarded on a five to one basis, i.e., five to the general public and one to an employee's youngster. The program provides for the establishment of six undergraduate scholarships to children of residents of the service area who are also customers of the company. At least one of these scholarships will be made available to the son or daughter of an employee. When all factors are weighed and considered by the scholarship awards committee, more than one of the scholarships could conceivably go to employee children.

2. All recipients are not required to show financial need. For employee's children financial need is not a requirement.

3. The article states that we will pay $500 per year to the college for each winner admitted. In order not to confuse this sum with the $500 paid for tuition, it probably should have read, "an additional $500." Actually, the company pays $1,000 per year per student—$500 for tuition and $500 directly to the college which the grantee attends for use in whatever manner the institution decides. Thus in your last paragraph the phrase "the company will be supporting 24 scholarships at the cost of $12,000 a year" is in error. The amount will be $24,000 if the program is continued over a four year period as expected. The wording, too, is slightly amiss and should read "The company's program when in full effect anticipates a total of 24 company scholarship in force."

4. The company is not represented on the scholarship awards committee as reported in the last paragraph. Such representation, we believe, would be a serious mistake on our part.

W. H. Rodgers, Jr
Advertising & Publicity Manager
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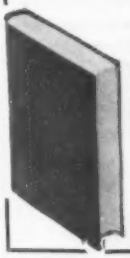

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1100	General Motors	16-278A	1600	720	320	Enterprise	DSG-6	560	450
750	General Motors	12-567	1080	720	300	General Motors	8-268A	450	1200
700	Worthington	EE-8	1000	327	200	General Motors	8-268A	350	900
500	General Motors	8-278A	750	720	150	Worthington	CC-4	225	450
500	General Motors	8-567	720	720	150	Ingersoll-Rand	S-4	225	600
500	Alco	6-12 (x13T	750	600	150	Buckeye	80	240	600
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3 ph, 60 cy.

Qu.	KW	Make	Speed	DC Volts	AC Volts
1	3000 3U	G.E.	514	600	4000/13200
2	2000	G.E.	450	250	2400
2	2000	G.E.	514	600	6600/13200
1	2000	G.E.	500	666 25 cy.	11000
2	1750	G.E.	514	250	2400
1	1500	C.W.	514	115	4800/13800
1	1500	G.E.	720	600	12300
1	1000	G.E.	900	260	4100/6900
2	1000	Whse.	900	600	2300/4150
1	750	Whse.	900	275	2300/4150
1	500	Whse.	1200	125/250	2300
1	500	Whse.	900	250	440
1	500	G.E.	720	125	2300

TRANSFORMERS—60 Cycle

Qu.	KVA	Make	Type	Ph	Voltages
1	5000	Whse.	OISC	3	33000x26400/13200
1	2500	Whse.	OISC	3	26400/13200 x 480
3	2000	G.E.	HVDDJ	1	66000 x 13800
1	1500	G.E.	HT	3	13200 x 2300
3	1250	G.E.	HVDDJ		6800/550
3	1000	G.E.	HVDDJ	1	2200/480

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OFFICE & SHOP
51 Howell St. Jersey City 6, N. J.

What is YOUR Problem?

Competent men for your staff? Employment?

Or, are you looking for — or offering — a business opportunity of special interest to men in the industry served by this publication?

The solution of any of these problems can logically be found *first* among *other* readers of Electrical World. You can get their attention—at small cost—through an advertisement in the Searchlight Section of

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TRANSFORMERS

2— 750 KVA G.E., 3 Ph., 4150V. 120/240V. sec.
2— 750 KVA G.E., 1 Ph., 4600V. 115/230
2— 400 KVA Pitts., 1 Ph., 2400/4800V. 240/48V.
3— 333 KVA Whse., 1 Ph., 2400V. 600 V. sec.
2— 300 KVA G.E., 1 Ph., 13200V. 220/440V.
1— 200 KVA G.E., 3 Ph., 2400-220 sec.
3— 200 KVA G.E., 1 Ph., 13200V. 440V.
1— 200 KVA G.E., 3 Ph. 4150V., 3 Ph. 2400V., Auto.

SYNCHRONOUS MOTORS

1— 300 H.P., Elec. Mach., 720 RPM. 3 Phase 60 cyc., 2200V T E F Cooled Outdoor service.
1— 150 H.P., G.E., 1800 RPM. 220V. 3/60.
2— 150 H.P., Al. Chal. 360 RPM. 440V. 3/60.

MOTOR GENERATOR SETS

1—1000 KW Whse., 600 V. 720 RPM. 4000 Syn.
1—1000 KW G.E., 600 V. 514 RPM. 4000 Syn.
1—1000 KW Whse., 275 V. 720 RPM. 4000 Syn.
1— 200 KW Whse., 250V., 900 RPM. 4000V. Syn.
1— 150 KW G.E., 125/250V. 1200 RPM. 2300 Syn.
1— 100 KW G.E., 250V. 900 RPM. 2300V. Syn.

SLIP RING MOTORS

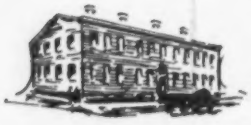
2— 500 H.P., G.E., M 1200 RPM 2400 V.
1— 400 H.P., West., CW. 450 RPM. 550V.
1— 250 H.P., West., CW. 600 RPM. 440V.
1— 200 H.P., West., CW. 600 RPM. 440V.
3— 150 H.P., Al. Ch. 1800 RPM. 2300V., 3PH. 60 Cy.

Large Stock of A.C. and D.C. Equipment

ETL

also means

EVER TRAINING* LABORATORIES



from this plant in 1896

— when central stations supplied lamps as a part of electric service — and from which "Specification-Test Certification" procedure originated.

to this plant in 1954

— from which year-by-year ETL Certification is awarded to millions of products brought to a requisite standard* — Labels give VISIBLE evidence for customer identification.

* *Your dictionary defines TRAIN as "to bring to a requisite standard."*

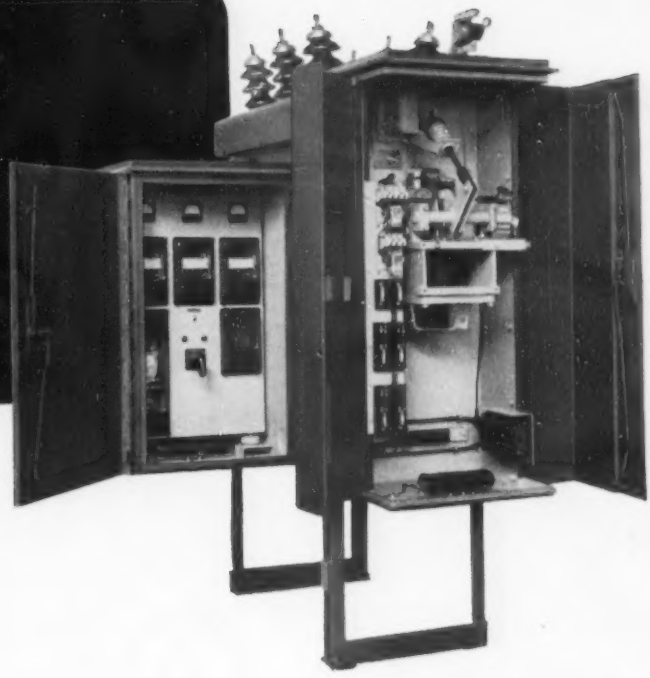
ETL's work during the past 58 years has been cooperation with manufacturers in developing products which provide good quality electric service, and in some cases identifying them with VISIBLE EVIDENCE.

ELECTRICAL TESTING LABORATORIES, INC.

2 East End Avenue at 79th Street, New York 21, N. Y.

Get the breaker with these PLUS FEATURES

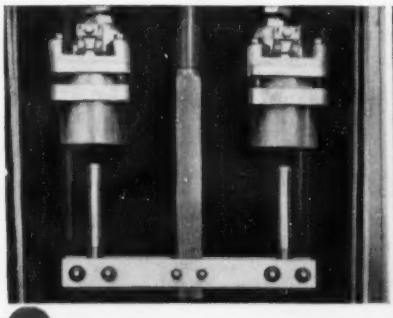
Here's increased operating convenience with high safety factor

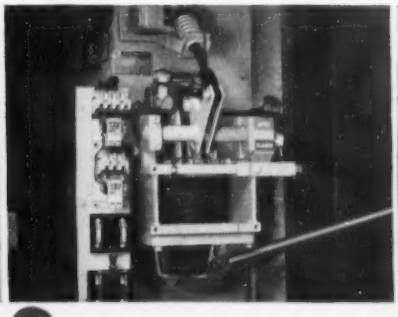


TANK PER PHASE construction — as used in large breakers — eliminates possibility of internal phase-to-phase flashover.

ACCESS FROM THREE SIDES. Side hinging of L-shaped doors allows side as well as front access to operator cabinet. Operator is high speed solenoid type — mechanically and electrically trip-free. Linkage is basically same as used on large A-C breakers.

NO FALSE OPERATION of relays. Operate the breaker — slam the door — or let the wind slam it and relays can't operate accidentally. Relay panel is in separate cabinet from operating mechanism and is 4-point mounted on shock absorbers. No hinge wiring either! Separate door in rear of cabinet provides access to back of relays.





TULIP AND BAYONET CONTACTS are self wiping, self aligning. Note also, double break per pole design and time-proved *Ruptor* interrupting device are used. Here again, Allis-Chalmers is using the same quality construction as is used on large A-C breakers.

VISIBILITY PLUS. Maintenance closing device is side operated. Man closing breaker can observe contacts and man working on them. In addition, external position indicator easily visible at a distance from front or side. Inside position indicator also provided.

NO BURIED LEADS. Simply remove three pins at bottom of fabricating wiring duct to expose bushing current transformer leads. No conduits, pipes, fittings to remove. This is just one more feature that makes this the outstanding distribution-type breaker today.

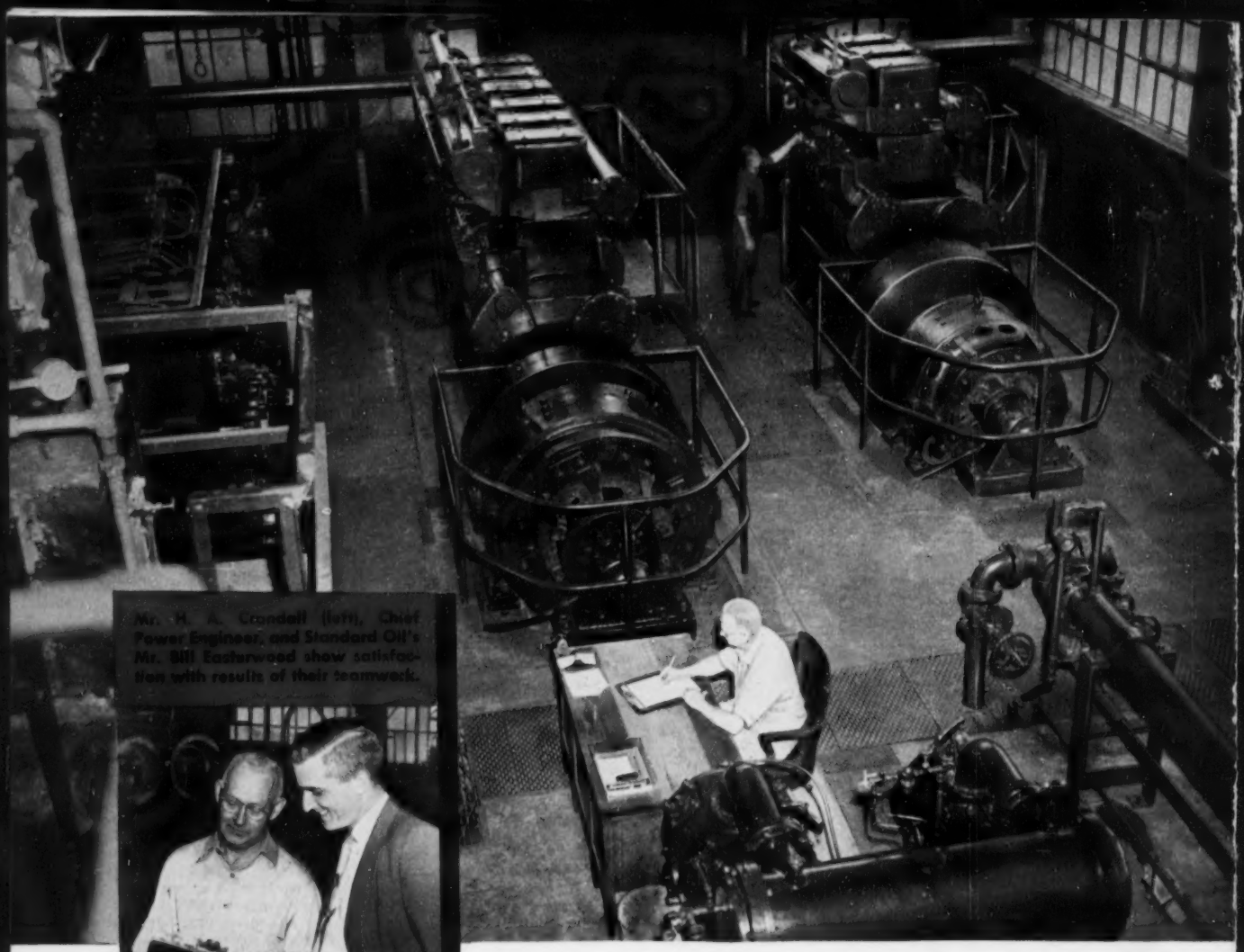
GET COMPLETE INFORMATION. Call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

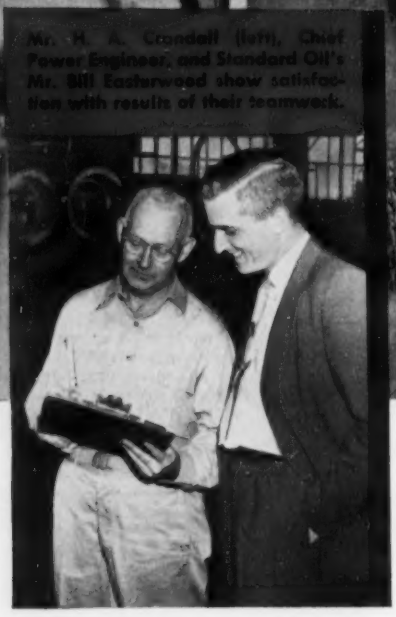
A-4255

Ruptor is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS





Mr. H. A. Crandell (left), Chief Power Engineer, and Standard Oil's Mr. Bill Easterwood show satisfaction with results of their teamwork.

Here's a 27,000-hour record for low wear and clean operation!

● This diesel power plant serves a large midwest manufacturer of steel products.

The plant superintendent was increasingly aware that lubrication of his two diesels was not all that it should be. There was trouble with stuck rings, and crankcases showed excessive deposits. Working with a Standard Oil lubrication specialist, the superintendent switched his engines to STANDARD HD Oil.

During some 27,000 hours' operation of each unit, engines have remained exceptionally clean. Ring sticking troubles have been eliminated. Cylinders have shown less than 0.01" wear — a reduction of 50% over the previous, similar period. Neither of the original fills of STANDARD HD have needed to be replaced.

Midwest diesel operators are getting record efficiency and economy with the help of STANDARD HD. Your Standard Oil lubrication specialist can help you get similar results. Phone your local Standard Oil office. Or, write: Standard Oil Company, 910 South Michigan Ave., Chicago 80, Ill.

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